Extension implications of budgets in decision-making as illustrated by dryland alternatives for diverted wheat acreage
by Thomas S Rackham

A THESIS Submitted to the Graduate Faculty in partial fulfillment of the requirements for the degree of Master of Science in Agricultural Economics at Montana State College
Montana State University
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Abstract:
This thesis is an exploratory study in the extension-farm management problem area. It is based on the diverted wheat acreage problem in Montana. Wheat_acreage allocations generate enterprise selection and combination problems for specialized wheat farmers. Extension agencies may be involved in educating these farmers in how best to seek a solution to their current problems.

It is thought that farmers faced with problems of this kind can best prepare themselves for decision-making relative to their individual circumstances by using a budgeting method of analyzing the alternatives which lie before them. The objective of this study is to lay out a budgeting method which can serve this end as well as provide a vehicle for extension demonstration of how on-the-farm choices between alternatives may be made. A series of illustrative budgets for a synthesized case farm is used as a model.

Analysis of this array of budgets indicates some of the short-comings of the method yet demonstrates the potential effectiveness of budgeting in compelling the budgeter to make a critical study of his business operation and an explicit selection of assumptions relevant to the problem.

The comparisons made bring the budgeter into decision-making areas of thought relative to purely monetary considerations. However the budgets fail to take explicit account of the non-monetary aspects involved in the farmer's considerations, which nevertheless have far-reaching effects on his economic decisions.

Some thought is directed towards the development of a formalized consideration of these non-monetary objectives of the farmer. Also considered is the possibility of improvement in the kind and sources of data basic to farm budgeting. Further research in these two problem fields is indicated.

EXTENSION IMPLICATIONS OF BUDGETS IN DECISION-MAKING AS ILLUSTRATED BY DRYLAND ALTERNATIVES FOR DIVERTED WHEAT ACREAGE

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T. S. Rackham

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ABSTRACT

This thesis is an exploratory study in the extension-farm management problem area. It is based on the diverted wheat acreage problem in Montana. Wheat acreage allocations generate enterprise selection and combination problems for specialized wheat farmers. Extension agencies may be involved in educating these farmers in how best to seek a solution to their current problems.

It is thought that farmers faced with problems of this kind can best prepare themselves for decision-making relative to their individual circumstances by using a budgeting method of analyzing the alternatives which lie before them. The objective of this study is to lay out a budgeting method which can serve this end as well as provide a vehicle for extension demonstration of how on-the-farm choices between alternatives may be made. A series of illustrative budgets for a synthesized case farm is used as a model.

Analysis of this array of budgets indicates some of the short-comings of the method yet demonstrates the potential effectiveness of budgeting in compelling the budgeter to make a critical study of his business operation and an explicit selection of assumptions relevant to the problem. The comparisons made bring the budgeter into decision-making areas of thought relative to purely monetary considerations. However the budgets fail to take explicit account of the non-monetary aspects involved in the farmer's considerations, which nevertheless have far-reaching effects on his economic decisions.

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PART I

INTRODUCTION

Extension-Economics Problem Area

"What a man hears he may doubt; what he sees, he may doubt; but what he himself does, he cannot doubt." 1/ This statement illuminates one of the basic means of achieving the objective of agricultural extension, the effective transformation of ideas into practice. It is particularly apropos in revealing a weakness in the field of extension farm management. Heretofore widespread efforts in telling and showing farmers the value of farm management as a conscious activity seem to have met with rather limited acceptance, even in the elementary phase of keeping adequate farm records. 2/ What lies behind this slow adoption of a worthwhile practice in an environment calling for increasingly urgent farm adaptability?

Background to extension-farm management problem.--Two of the more obvious characteristics of the agricultural industry are its magnitude and wide

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1/ Anonymous statement appearing in Saskatchewan Farm Science, Ext. Dept. College of Agriculture, Univ. of Saskatchewan, Vol. 1, No. 1, (February, 1954) p. 2.

2/ According to Bradford and Johnson, management is an intangible part of production seen only through observing the decision-making process and its results. A good manager must have the self-discipline to:
"Direct thinking toward opportunity for attainment.
Attack problems preventing attainment of his objectives.
Extract the optimum information from his environment.
Carry analysis for each decision to a favorable degree.
Take prompt action on his decisions.
Accept the consequences of his actions."
Bradford, Lawrence A., and Johnson, Glenn L., Farm Management Analysis, John Wiley & Sons, Inc., New York, (1953).

dispersion. Both of these features tend to obstruct rapid dissemination of information because the industry depends not on easily reached, large scale, centralized, and co-ordinated areas of activity, but on the individual efforts of numerous independent and virtually isolated one-man firms. In non-agricultural industry progress depends on the skillful and personal competitive managerial capacity of relatively small and well trained administrative groups. Progress in agriculture depends less on concentrated managment and more on an infiltration of ideas (or else outright regulation) throughout the industry-wide distribution of the single-celled farm entities which comprise a country's agricultural base.

All manner of means may be used in the presentation of these ideas but the consummation of progress will not be complete until an idea is accepted, assimilated, and put into action by each and every farmer concerned. Each one, by the very nature of his independence, will be stimulated at a different time, by a different means, and to a different degree of activity than his neighbor.

There was a time when decision-making on the farm revolved around the production of personal household requirements of subsistence. Changes came slowly enough that consequences of mistakes could almost be ignored, and if they became too oppressive for the farmer to bear, he could move on and make a new start on the frontier.

Farm management decisions now revolve around those enterprises which ultimately produce marketable goods from which the greatest return possible may be derived from the resources applied to their production. For the

individual contemporary farmer a faulty decision resulting in poor timing, inadequate use or availability of resources, or a mis-estimate of marketing conditions, may be so critical to the well-being of his farm as to spell the difference between success and failure.

Year by year the consequences of mistakes in farm management have become increasingly damaging to individual well-being. Intelligent decision-making on the part of all farmers is thereby becoming of paramount importance to the well-being of the industry. The alternatives indicated are either agricultural chaos and hardship, or an all-embracing administrative regulation which replaces a large part of the individual responsibility for correct decision at the farm level.

Extension functions in farm management.--Every year there are fewer farmers in the United States. Farm firms are larger. Production is higher than ever. Faced with buoyant costs and subsiding product prices, these business firms are more dependent than ever before on efficiency for success. There is less and less room for management errors. There is more and more room for management techniques designed to overcome difficulties in fitting production systems to farm resource patterns and marketing outlooks. Extension programs need to provide means for more intelligible interpretation of information relevant to immediate problems and to create vehicles capable of drawing farmers into active and conscious participation in decision-making processes. The aim should be to break down any inertia present in farmers' attitudes towards farm management problems, stimulate recognition of problem

situations, stimulate anticipation of forthcoming shifts in economic environment, and stimulate logical step by step reaction to these situations. To sum up, extension should seek to lead the farmer into practicing systematic farm management decision-making procedures.

This calls for further study of any peculiar economic characteristics of the farm firm from which stem obstacles to the application of ordinary business management procedures. There are other obstacles with sociological roots, particularly in the innate character of man withdrawn into the security of his own domain. Every farm has elements of a minute independent principality which leads to a lack of uniformity aswell as an economic and social disunity not commonly found elsewhere in society. Such attitudes of independence and self-sufficiency associated with farming are vestiges of past stages in social development which are not in keeping with the organization of contemporary society. Yet "wishful thinking" of this order is probably the main reason farmers cling to their farms, even though they may be better off economically in other occupations.

Extension has to breach these barriers with farm management ideas which impose on the prerogative of the farmer who may say "I know how to run my own business" or "Nobody can tell me what to do on my farm." These feelings go a long way in explaining non-receptive attitudes encountered on many farms. However these same farmers admit their need of farm management help by the all too common retort, "You don't need to tell me how, I alreay know more than I can put into practice." This is

the crux of the extension problem in farm management, to achieve an effective demonstration of how to get from where you are to where you would like to be in conclusive terms.

Certainly no panacea is expected to be found which will solve this problem of "getting across" to farmers with farm management techniques. The great heterogeneity of the agricultural industry denies that any overall detailed method is likely to be developed. Rather if each segment is taken separately, the weak spots may be ascertained and the problem attacked according to the individual characteristics of that segment. The wheat producers of the United States constitute such a segment of the agricultural industry. A weak spot offering one possible area vulnerable to extension attack is the diversion of acreage from wheat production resulting from the surplus wheat situation.

The Nature of the Surplus Wheat Problem

In the United States there are large agricultural areas in which wheat has characteristics of adaptation which make it easier to grow than competing crops. Because it is more dependable than other cash crops, it may be grown in preference to other kinds of grain whether wheat prices are favorable or not. There is also a high degree of uncertainty from one year to another as to the eventual out-turn of each succeeding crop. In the face of these conditions an oversupply situation is little deterrent to production. Historically, as well, the reaction of single-enterprise wheat farmers to depressed price levels has been an effort to produce more of their product, thus accentuating any existing surplus difficulties. In the

short-run, therefore, wheat production in this country responds slowly to unfavorable market conditions, and uncertain though it may be, tends to exceed national needs.

The world market for United States wheat is equally changeable, thereby increasing the problems of surplus disposal. For instance the post-war return of off-shore countries to greater self-sufficiency in wheat production tends to dry up United States export trade in wheat. In the remaining free markets United States wheat may sometimes be at a disadvantage due to exchange and quality considerations. At the same time the home market, rather than expanding with the current population increase, remains relatively static due to a declining trend in per capita consumption of bread.3/

Thus commercial wheat producers as a group have occupied an inherently unstable position in the national economy. In an effort to stabilize the position of these wheat producers but somewhat in contradiction to the import of the above circumstances, national agricultural policy in the past several years has encouraged a continuing full-scale production of wheat.

3/ Gray, Sorensen, and Cochrane cite M. K. Bennett as the original author and then proceed to elaborate on the relationship between wheat and potato consumption expressed as a national "cereal-potato ratio" which is primarily associated with the level of economic development of a country. The advancing economic development of the United States has resulted in a trend towards an increasingly varied diet which in turn has led to declines in both potato and wheat per capita consumption. Other factors leading to continuing adjustments may emerge. For further details see Roger W. Gray, Vernon R. Sorenson and Willard W. Cochrane, The Impact of Government Programs on the Potato Industry, Univ. of Minn., Agric. Exp. Sta., Tech. Bull. 211, (June, 1954), pp. 15-21.

This has been effected by guaranteeing a relatively favorable (by comparison with other agricultural products) and for most conditions a profitable price level for wheat. 4/ This high minimum price level has had the subsidiary effect of still further restricting the market for wheat by shutting off its effective competition with other products for use as livestock feed or for industrial non-food processes. Add to this situation the effects of a run of good years combined with technological advances in agricultural production which together have resulted in wheat crops considerably above expectations based on past experience.

Altogether, many natural and economic phenomena have led to the accumulation of ample reserve stocks and an actually burdensome surplus of many classes of wheat in the United States. The growth of this surplus is illustrated by Table I.

Table I.--Wheat supply and disappearance, United States, 1950-54. a/

Year Beginning July 1.	Supply			Disappearance			
	Carry-over	Production	Total b/	Processed for Food	Other Uses and Disposal	Exports c/	Total
	- 1,000,000 bushels -			- 1,000,000 bushels -			
1950	424.7	1019.4	1456.0	489.8	235.5	334.5	1059.8
1951	396.2	980.8	1408.7	481.5	201.2	470.3	1153.0
1952	255.7	1299.0	1576.2	474.2	223.8	315.7	1013.7
1953	562.5	1169.5	1737.5	473.8	146.6	215.2	835.6
1954 d/	901.9	969.8	(1874.7)	-----	-----	-----	-----

a/ Compiled from the Wheat Situation, U.S.D.A. Agricultural Marketing Service, (February 28, 1955).

b/ Includes small imports; not a direct summation of carryover and production.

c/ U. S. procurement for export. d/ Preliminary.

4/ Some indication of the possible effects of price supports on the wheat industry may be drawn from the study of Gray, Sorenson, and Cochrane, op. cit. pp. 86-87.

This, then constitutes the current national problem relative to wheat production. How may the surplus be reduced or held to manageable size without throwing the affected segment of agricultural industry into chaos or disrupting the currently accepted international economic relationships? To handle the problem within the United States constraint of off-farm sales of wheat has been suggested. This merely places the onus of storage upon the farmer. Although there may be more waste the surplus problem remains since there is no strong force to limit production as long as price maintenance remains an integral part of agricultural policy. The United States government has chosen to institute a direct means of production control through wheat acreage reduction, with a supported wheat price only directly available to the production from the allocated acreage. At this point the national problem generates a problem of direct concern to the wheat farmer in that he must decide how he will adjust his farm operation to comply with the new constraints.

Diverted Acreage Research In Montana

This problem of what to do with acreage diverted from wheat production has been the subject of a study first initiated at Montana State College in 1948. Briefly stated, the objective of the study at that time was to find out the feasibility and cost of shifting wheat land out of wheat production into alternative uses. The reason for starting the investigation then was the prospect that a mounting surplus of wheat would either necessitate an acreage control program or cause a decline in wheat prices.

Progress up to 1954.--O. L. Mimms lists a number of possible alternatives in the use of diverted wheat land.5/ He also discusses the obstacles which lie in the way of satisfactory use of diverted acreage. First, he says, farmers' "lack of information" impedes decision-making relative to acreage reduction because they suffer uncertainty as to price levels and the direction of government policy. Secondly, wheat farmers lack experience with other crops and livestock enterprises. Thirdly, many wheat farms lack the water and pasture resources imperative for stock production. Fourth, these farmers face financial obstacles in the form of the investment costs required for establishing new enterprises. Fifth, some areas lack adequate community facilities, such as schools, to permit year round residence on the farm. Sixth many farms are too small, a vital factor, perhaps under-rated. Mimms describes the critical factor here as being that even without acreage reduction many wheat farms are so small that "pressure for survival is great."6/ Even a substantial resource diversion on these farms provides inadequate land or other resources to support a worthwhile alternative enterprise. The seventh and last obstacle listed is the prevalence of tenancy. This creates obstacles to efficient use of diverted acreage because owner-operator agreements are rigid and the contracting parties

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5/ Mimms, O. L. "Diverted Acres in the West. - Some Farm Organization and Other Problems," Proceedings, Western Farm Economics Association, (1950).

6/ For further details see Rainer Schickele, "Farmers Adaptations to Income Uncertainty," Journal of Farm Economics, Vol. 32, (Aug., 1950) pp. 363-374.

resist change, while the location and size of rented tracts relative to the operator's head-quarters are frequently unhandy.

Research up to 1950, reported by Mimms, indicated that increases of summerfallow (with some exceptions) to take up the diverted acreage constituted one of the best alternatives, assuming that crop yields responded as expected. Other alternatives had obstacles such as probable administrative controls for barley and feed wheat, price and yield uncertainties for crested wheat grass seed, significant added investment for cattle or hogs. He indicated that considerable refinement of standards used in setting up budgets was necessary and that continuing research on the problem would yield returns in more perfect knowledge.

However, interest in the problem remained relatively dormant during the Korean hostilities, and the project was sidetracked. In 1953 Baker re-opened active consideration of the research when he revised Mimms' budgets in line with then current prices.7/ He pointed out that a 25 percent reduction in wheat acreage would, if no adjustment were made to other uses of the resources, reduce net income on dryland farms by about 35 percent. The feasibility of the possible alternatives, relative to Mimms' results, remained much the same income-wise except that the cow-calf enterprise assumed a lower position due to decline in cattle prices. For all alternatives the level of income had declined since 1950 because product prices

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7/ Baker, C. B., "What Are Alternatives for Reduced Wheat Acres?", Montana Farmer-Stockman, (July 15, 1953).

had remained stable or fallen off, while costs had reached higher levels. Baker's work indicated that enterprise replacement possibilities are largely limited to those which can minimize but not wholly replace the loss of income resulting from wheat acreage reduction.

In this connection there is another course of action for which the possibilities have been described by M. C. Taylor in a recent article.8/ He develops instances of economic situations some of which would favor compliance and others non-compliance with the acreage allotment program, as it exists for the current 1955 season. So long as the control legislation remains permissive, as it is now, a farmer in his own interest (this however may not be in the national interest) may decide that his best alternative could be non-compliance rather than compliance. Currently this decision would rest on the amount of over-seeding and the farmer's anticipated wheat yield relative to "normal" yield for his farm, as well as anticipations regarding relative yield and price of barley in respect to wheat. A contingent factor would be availability of storage for any excess wheat that might be produced.

Implications of research already published.--There is a rather general idea that possible alternatives for specialized wheat farmers are quite restricted. This may result from the long-time dominant position of wheat which has tended to obscure recognition and acceptance of the alternatives

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8/ Taylor, M. C. "Wheat Acreage Allotments -- Compliance or Non-compliance," Montana Farmer-Stockman, (March 15, 1955).

which are available. However examples of successful development of enterprises other than wheat can be found in wheat producing areas.9/

A review of the work already done establishes the fact that there are many relatively unexplored alternatives which may temporarily relieve the financial stress imposed by acreage restriction. In addition an extension publication provides information and suggests uses for diverted acreage, aimed not only at maintenance of income, but at indirect benefits such as conservation and weed control.10/ However in the light of the obstacles listed by Mimms all the alternatives which may be proposed cannot be considered by all farmers faced with acreage reduction. In fact it appears that many will not succeed in finding a suitable alternative at all.

It can be seen that the number of possible alternatives are not so restricted, but the opportunities for developing them are. The implication is that public and private research should be aimed at uncovering not only all the possibilities that are presented but also means of circumventing the obstacles to their development. This further implies that extension services should be prepared to demonstrate how those concerned can develop their individual opportunities for adjustment to new situations.

9/ The combination sheep and wheat or cattle and wheat ranch appears on all sides. The writer has observed a 5,000 acre wheat farm near Taber, Alberta, from which turkeys have been marketed since 1946, reaching a volume of 12,000 birds in 1953.

10/ Diverted Acres, Ext. Pub. Ag. - 26 (Revised), Extension Service, Montana State College, (September, 1953).

Orientation of Current Study

Wheat acreage diversion implications for extension.--The application of wheat acreage allotments forces changes to be made on wheat farms. The extensive adjustments which have to be made may be best illustrated by the remarks of O. L. Mimms when introducing a 1950 report on his study dealing with the situation. He said:

> "Under wartime pressures and later incentives wheat farmers in parts of the Great Plains and other areas extended their acreage to the limit. Some continued good practices and kept near the optimum amount of fallow. But others stubbled in a lot of wheat. Several million acres of grassland were broken and seeded to wheat. In total the increase was 30 million acres --from 53,000,000 in 1942 to 84,900,000 in 1949. While I doubt that we either shall or should cut back to the 1942 acreage, some cut is inevitable and desirable. We may need 20 to 23 million fewer acres in wheat. The 1950 acreage is about 12 million below 1949. Specifically where the cuts will be is one thing and where they should be may be quite another. But we may be quite sure that the big portion of any major cut, acreage and production wise, will be in the wheat country. The Great Plains and the Pacific Northwest had about 80 percent of the 1949 acreage. Most of the wartime and later increases were here also--84 percent of the 30 million.
>
> "The big increase in wheat acreage is relatively recent but many farm organizations are geared to the high level. A cut back of 15 or 20 or 25 percent would not be simple, farm by farm, and it would add up to one of the greatest land use problems faced since the dust bowl and depression 1930's."11/

Even without intervention by the government the surplus wheat situation would have necessitated eventual widespread adjustments among wheat farmers. The remarks above hint at other mal-adjustments such as land abuse. The need for adjustment of farm practice is reason enough to expect

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11/ Mimms, O. L., op. cit.

the involvement of extension services in the problem areas. These circumstances suggest that there could be wide-spread opportunities for worthwhile communication between farmer and extension agent.

In this situation adjustment problems are seen mainly as those of enterprise combination and organization. Decisions have to be made one way or another. This should provide a target for extension work in farm management, since wheat farmers may be susceptible to management suggestions when failure to respond to the acreage reduction program spells a loss of income. Here perhaps progress could be made in introducing improved techniques for resolving problems of enterprise combination on the farm.

Projection into objectives of current study.--The problem of surplus wheat production may long be with us. Consequently wheat farmers are more and more likely to be found wrestling with problems concerning enterprise alternatives. If they can approach their problems in a systematic manner and draw on any local features or individual circumstances which give them an advantage, the resultant decisions should place them in the most favorable position possible. Certainly the variation from farm to farm, in possibilities for the use of resources diverted from wheat production, is great enough that the solution can more easily be found on an individual basis than on a group basis. Further it may be anticipated that other problems will develop from acreage diversion. Perhaps there will result from this a need to provide single enterprise wheat farmers with additional training in how best to cope with problems of enterprise combination. This thesis attempts to anticipate this need and suggest ways in which extension services may go about the job.

The work of this thesis becomes, therefore, not an effort to find suitable alternatives, but a projection into the field of extension. The enterprises suggested by this study are likely to be useful to relatively few farmers from the point of view of putting them into actual practice. However, the work is developed only in part to be used as a guide for those who may be best situated for adopting the alternatives considered. Beyond this point the methodology is designed to be helpful to a larger group as an illustration of a method of comparing enterprise alternatives of any kind that might be of interest to them. The main objective will be to demonstrate how a selection may be made from among the known alternatives, thus providing a tool which the extension workers may use in their contacts with wheat farmers.

Locale of study.--Alternatives may be expected to vary greatly over a widely dispersed group of wheat farmers such as would be found in the state of Montana. Previous work on this project has related to two main "dryland" farming areas. These differed markedly in environment so that considerable difference in response to acreage reduction might be expected. Consequently the area of consideration for this study has been confined to the "Triangle" area. In order to reduce the scope of study still further the ensuing budgets apply primarily to a relatively homogeneous group of winter wheat farms concentrated in the inverted apex of the so-called triangle. It is within this environment that the reactions and needs of the farmer will be examined as a base for extension work.

Description of study area.--12/ The area referred to occupies a large part of the north central crop reporting district and the northern portion of the central district. Specifically the counties receiving consideration for comparative purposes are: Judith Basin, Fergus, Cascade, Choteau, Teton, Pondera, Glacier, Toole, Liberty, and Hill.

In the main, dry farm land in this central and north central part of Montana varies from level to gently rolling. The chestnut and brown plains soils are relatively deep and generally of loam to clay loam textures. Altitudes range from below 3000 feet in the northeast part of the area and in excess of 4000 feet in the western and southern portions. At the higher altitudes the frost-free season averages as little as 105 days, although for the major part of the area the season will extend to 120 frost free days or more. The winters are shortened and moderated by virtue of being in the Chinook belt, but the same winds for the balance of the year are detrimental since they are very drying and their turbulence tends to lift the soil readily. Precipitation is most favorable adjacent to the Rocky Mountains in the northwest and particularly in the apex of the triangle north of the Little Belt Mountains, where the average annual precipitation is in the fifteen to twenty inch zone. By contrast, the northern base of the triangle adjoining Canada is in the ten to thirteen inch zone.

12/ Bolster, H. A. and Stucky, H. R., Montana's Agriculture, Montana Agric. Ext. Service Bulletin 228, (May, 1945).

Type of farming.--The climatic features, which are characteristically extremely variable from year to year, have been mainly responsible for the development of the predominant kind of agriculture in the area. Besides climate, topography and soils generally favor a large-scale mechanized system of farming. The altitude and latitude are within a range favorable to cereals. Consequently, the predominant type of farm is the cash grain classification shown in Table II.

Table II.--Number of farms by type of farm--selected counties of Montana, 1950. a/

County	Acreage in Farms and Ranches	No. of Farms and Ranches	Type of Farm		
			Cash Grain	Livestock	Other
	1000's omitted		%	%	%
Judith Basin	860	490	53.5	40.0	6.5
Fergus	2046	1203	45.8	36.7	17.5
Cascade	1498	1146	34.5	34.5	31.0
Choteau	2217	1143	80.0	13.0	7.0
Teton	1227	1001	65.5	13.5	21.0
Pondera	817	688	77.6	12.4	10.0
Glacier	1020	452	32.7	34.6	32.7
Toole	1082	438	74.2	12.6	13.2
Liberty	896	362	78.5	14.9	6.6
Hill	1641	959	60.9	22.4	16.7
Total	13,304	7882	4653	1882	1347
%		100	59.0	23.9	17.1

a/ Compiled from Federal Census, (April 1, 1950).

Precipitation is a critical factor for crop growth as demonstrated indirectly by Table III which shows a high proportion of the arable land

Table III.--Main land use--selected counties of Montana, 1950. a/

County	Acres 1949			
	Harvested Cropland	Cultivated Summerfallow	Non-Cultivated Pasture other than Woodland	Acreage Irrigated
	%	%	%	%
Judith Basin	19.6	10.5	69.9	1.0
Fergus	19.1	11.4	68.3	0.6
Cascade	17.3	11.4	66.3	2.5
Choteau	23.0	21.0	55.6	0.2
Teton	24.8	17.7	40.5	8.5
Pondera	32.3	28.5	27.4	5.9
Glacier	13.0	7.6	76.2	1.6
Toole	19.0	17.7	63.3	0.2
Liberty	26.3	26.3	47.4	0.2
Hill	24.6	26.4	49.0	0.2
Total Acreage	2,666,927	2,176,467	7,429,275	221,149
%	21.7	17.7	60.6	1.8

a/ Compiled from Federal Census, (April, 1950).

cultivated for summer fallow in order to conserve otherwise inadequate rainfall. Crops are favored which have a low water requirement. Those capable of making maximum use of spring moisture and able to avoid mid-summer drought have an added advantage. Also desirable are crops which can to some degree protect bare summerfallow from wind in the fall and

spring. Winter wheat succeeds best in relation to these determinants and therefore is used wherever possible. However, the seasonally variable nature of the climatic factors results in frequent occurrences of unfavorable seeding and growth conditions so that harvested acreage of winter wheat varies greatly from year to year. Table IV shows that winter wheat is not by any means supreme, and is definitely least predominant in the

Table IV.--Cereal crop distribution--selected counties of Montana, 1953 a/

Area		County	Acres Harvested 1953		
			Winter Wheat	Spring Wheat	Barley & Oats
Census Area VI	Central Winter Wheat Area	Judith Basin	57,300	57,500	21,500
		Fergus	130,000	106,400	39,300
		Cascade	153,200	36,200	19,600
		Choteau	234,500	272,800	27,500
		Teton b/	122,600	108,000	34,900
Triangle Area	Northern Spring Wheat Area	Pondera	39,800	175,500	48,900
		Glacier	8,800	63,100	87,300
		Toole	12,400	223,000	27,600
		Liberty	23,200	206,100	5,700
		Hill	64,300	407,600	19,500

a/ Montana Agricultural Statistics, Montana Dept. of Agric. & U.S.D.A., (December, 1954).

b/ Preceding years, spring wheat acreage exceeded winter wheat acreage.

dry northern segment of the triangle. One of the reasons for this is that the lower precipitation levels experienced in that zone are inimical to strong fall establishment and winter survival of fall sown crops. Sometimes winter killing is attributed to exposure due to lack of snow cover. Other reasons put forward are severe over-winter dessication in cold dry soil regardless of snow cover, and lack of adequate plant respiration when the fields are iced over for extended periods of time after a heavy thaw. Therefore, even in the most favorable locations, secondary reliance is placed on a less productive spring wheat crop. Table IV illustrates, if examined in conjunction with a generalized precipitation map of Montana, that the spring wheat crop becomes almost completely dominant in the driest counties. On the other hand, in relation to winter and spring wheat in these dryland counties, feed grains have been of minor importance due to their higher water requirement and greater susceptibility to drought when grown on dry land. However where somewhat more favorable moisture conditions exist, such as are found adjacent to the mountains and in the best winter wheat areas, experience has shown that suitable varieties of these crops can be successfully grown.

PART II

THE PROBLEM AND HYPOTHESES

The Problem

The farmer's point of view.--For the purpose of this study we are now concerned specifically with those few thousand specialized wheat farmers operating in the winter wheat belt of central Montana. It may be postulated that the case of one will fairly well represent the situation of all because of the environment underlying the development of a relatively homogeneous group of cash wheat-summerfallow farms in the area. The problem therefore is narrowed in the following discussions to the approach that any one such farmer might take.

Confronted by a management problem, which in this case is one of adjustment to an economic situation of administrative origin, the farm manager finds himself in a situation where he has imperfect knowledge 1/. How a farmer may behave in this situation is well described by Johnson and Haver in their classification of five knowledge conditions summarized below.

They suggest that there are three levels of subjective uncertainty. First is the inactive situation wherein ". . . the manager does not have enough knowledge to be willing to take a contemplated action and he does not value prospective improvements in his knowledge enough to cover the 'cost' of making such improvements." The second level is the learning

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1/ Johnson, Glenn L., and Haver, Cecil B., Decision Making Principles in Farm Management, Kentucky Agric. Exp. Sta. Bull. 593, (January, 1953), pp. 11-13.

situation which is ". . . one in which a person's knowledge is not complete enough for him to be willing to take a contemplated action but in which he values improvements in his knowledge more than the cost of making such improvements." The third level is the forced action situation wherein a farm manager may be ". . . forced by circumstance to take a contemplated action even though (he does) not know enough about it to be willing to do so."

Then there is the subjective risk situation in which the manager ". . . does not see the probable results of a contemplated action perfectly but nevertheless has enough information to decide whether to act or not to act; further he is willing to accept the consequences of this decision and action." Finally there is the subjective certainty or apparently perfect knowledge situation in which the manager's knowledge ". . . becomes nearly enough perfect for (him) to operate as though (he) had perfect knowledge."

The imposition of a wheat acreage reduction program involves each farm manager in a sequential decision-making process relative to the successive stages of knowledge in which he finds himself. The manager of a wheat farm first has to find out if the regulations will apply to his operation. In other words he must learn something about the program or suffer the consequences of not complying with the constraints it implies. If he finds that the provisions exclude his type of operation he may permit himself to relax into an inactive role regarding the program provided he plans to continue his accustomed practice. If, as in the case of the winter wheat producer under discussion, the administrative regulations apply to his operation, he is faced with a further learning process before he can take appropriate

action. He will want to learn what the consequences of non-compliance will be. He will want to learn what demands compliance will impose upon him. This then requires still further knowledge, in the form of appraisal of the production alternatives available to him, in terms of their relative advantages and disadvantages in the use of resources diverted from wheat production. On this appraisal depends his decision as to what action to take in the present situation. He still must learn how to accomplish the desired action effectively.

For any wheat rancher this decision cannot await indefinitely the weighing of pros and cons growing out of the learning process. The advancing seasons sooner or later place him in succeeding forced action situations whether he thinks he knows well enough or not what alternative he might best adopt. He finds that commitments should be made, such as for a supply of seed which then should be planted at the opportune time to make a crop. All the attendant chain of operations involved in his farming system must be consummated in their turn. How then can this manager, before he reaches these forced action positions, go about making the determinations necessary to reveal which of the alternatives known to him may best suit his individual circumstances? 2/

2/ Here also are implications relative to the flexibility of the farmer's plant or his ability combined with the capacity of the plant for consummating changes of organization as new information is forthcoming. As Castle says "Since it is recognized that complete stability can never be achieved an entrepreneur may desire an organization that is capable of rapid change." See Castle, Emery N., Adapting Western Kansas Farms to Uncertain Prices and Yields, Kansas Tech. Bul. 75, (February, 1954), p. 10.

The extension worker's point of view.--The extension worker's objective will be to provide the farmer with a method for making the best selection possible among the available alternatives. He will desire to do this without actually making any choices for the farmer. The problem is to get the farmer launched in a learning process that will result in his reaching definite conclusions about the alternatives in relation to his own specific environment. On the basis of these conclusions the farmer may be encouraged to make his own decisions as to choice of enterprise and manner of organization of resources, prior to finding himself in a forced action situation. Even if the extension worker cannot reach this objective he should consider that any learning he can stimulate would increase the probability that the farmer could make the right decision when in a forced action position.

A better comprehension of the extension worker's task may be illustrated by the following quotation:

> "Today's county agent must not only understand the farmer's needs, but also what motivates him to make decisions. The process of accepting new practices has always been a slow, tedious one. The four basic steps the farmer invariabily follows have been well outlined by Eugene H. Wilkening, associate professor of rural sociology at the University of Wisconsin:
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> "First the farmer must hear about the practice before he can proceed to make up his mind about it. Second, before deciding that the practice is a 'good idea', he must learn enough about it to see that its merits outweigh the merits of existing practices and the costs, labor, and 'trouble' involved in putting it into operation. Thirdly, the farmer must obtain the specific information needed to try out the practice on his particular farm.

"Finally, after trying the practice, its complete adoption may depend upon his understanding the reasons for any failure or problems that occurred in the initial trial." 3/

The practices referred to here are physical production techniques put into action following relevant farm management decisions. However, the reasoning is applicable to the practice of farm management, too. Will the method proposed for problem solution motivate the user to make decisions? Will acceptance of the methodology speed up decision-making activity? Does the methodology satisfy conditions of comprehensibility and facility of use which will "sell" it well enough that it will supersede existing decision-making processes? Does the method provide enough information that the farmer can try it out successfully? Will the reasons for any failure be sufficiently clear that the method itself will be exonerated? It is the success with which a method satisfies such questions, that determines whether the method proposed as an extension tool in farm management is efficient or not.

The research problem.--The problem of this thesis is to develop a method of enterprise selection by which extension workers can demonstrate to farmers how they may go about resolving on-the-farm choices between alternatives. The method settled upon will need to satisfy several conditions already touched upon. Has it the simplicity required to be readily comprehensible and demonstrable to farmers? Is it adaptable to the various situations

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3/ Berg, Gordon L., "In Summing Up," County Agent and Vo-Ag Teacher, Vol. 10, No. 6, (June, 1954), p. 48.

present in the problem area? Does it prepare the budget user for making those decisions which will initiate a line of action likely to be most suitable for him in his particular environment? Does it permit extension consultants to participate in a problem solving program, yet avoid specifying the choices to be made?

Hypotheses

Hypotheses relative to the reaction of farmers to the problem situation.--- The hypotheses offered in this section are advanced because it is felt that they illuminate subsequent parts of this thesis. However, these may be considered as little more than conjectural assumptions, particularly since no direct effort to test their validity is anticipated for this study.

Unless a method of attacking the problem is brought to their notice it is expected that many farmers will take the easy way out and make a decision at the moment when they are forced into action. Each farmer's decision may be based on his hunches at the time, the way he feels that day in the light of any past experience he may have relative to the problem, or on any information that may have so far come his way which he thinks has a bearing on what he should do. He will, however, have no real reason to expect that the immediate solution will prove to be the best one for the production period involved.

There will be other farmers who will acknowledge that a problem situation exists and make a systematic attack on it. A farmer in this position will attempt to foresee or learn the probable results of certain lines of action and plan his operations accordingly.

It may be expected that even without a systematic way of attacking it, the farmer's problem will be solved sooner or later either by his own logical reasoning as he gains experience, or by the propititious promptings of succeeding forced action decisions, or by asking someone else (perhaps the government) to solve it for him.

Hypotheses relative to the research problem.--It is thought that among the methods that might be used to select between alternatives a budgeting procedure will best fit the requirements of this case. First of all, it is considered to have a degree of simplicity which will make it more comprehensible to farmers than other methods. For this reason it is anticipated that it will be useful as an extension aid in demonstrating how enterprise selection may be undertaken. It is thought that these characteristics will make the budget method of dealing with the problem useful to larger numbers of extension personnel and farmers than less easily understood and demonstrated means of enterprise selection. This suitability for extensive distribution is desirable to allow for due consideration being given to the specific environment of each farm and the alternatives available to its manager.

Secondly, the budget method is thought to offer adequate preparation for decision-making on the farm (at least relative to monetary considerations), even though it may not provide as clear cut results as may be forthcoming from other methods. In this regard it is expected that the

use of budgeting on a wide scale will increase deliberate decision-making activity and reduce forced action decision-making, both for the individual and in an extensive area-wide sense.

PART III

ATTACKING THE PROBLEM

The Farmer's Approach

Unsystematic - forced action.--The single enterprise winter wheat farmer faced with an administrative order calling for acreage reduction may approach his problem without system, adopting a "wait and see" attitude. He may recognize that compliance will mean finding some other use for a part of his land, and that non-compliance will result in an unattractive price for his wheat. On the other hand he will have no diverted acreage problems. However, at fall seeding time he is not compelled to make a choice as to whether to overseed or not since compliance may be put off until a later date. There is also the possibility that acreage overseeded may be reduced by winter kill to the required level for compliance. Further decision may be postponed until spring seeding time arrives. At this time he will have to select a crop for what land is still unseeded or has been winter-killed. But for what acreage is still over-seeded to wheat he has a choice of re-seeding to some other crop or remaining out of compliance until the final permissable date. If through indecision at this point he does not spring-seed all the land that is required to be diverted to qualify for compliance, he will lose the spring seeded grain that might have been harvested from the overseeded acreage, or run the risk of losing money by having to accept the lower returns implied by the non-compliance penalty.

The farmer who approaches his problem in this way passes from one forced action position to another, solving his problem more by a default process than by any design. At any point of decision he may have very little idea as to whether the course of action he settles on should turn out better than the other alternatives. He probably will tend to take the course for which the result appears most certain at the moment.

Systematic.--On the other hand the farmer who follows a systematic approach to his problems will settle down and make some calculations by which he may be guided in decision-making. He may end up by following exactly the same program as the farmer in the previous case, except that he knows ahead of time what he plans to do and can make preparations for his actions. He also may be fairly well assured from his own estimations that his course of action is the best one available under the circumstances. His primary concern may be assumed to be a maximization of net income from the resources at his command, or in the current problem situation a minimization of the "loss" he anticipates from a reduction in wheat acreage or non-compliance penalties.

If he remains out of compliance the diverted acreage is no problem. If he is in compliance he has diverted acreage to utilize and under-employment of equipment and labor to consider. His first move may be to cast around in search of a supplementary crop enterprise which will employ these resources profitably. He will attempt to select one which will compete to a minimum degree for resources required for the wheat

enterprise. Such an enterprise would be least likely to disturb the established routine of his farm operations and his off season activities. This constitutes a stop-gap kind of solution to his problem.

He may consider a second broad alternative--that of integrating a complementary-supplementary livestock enterprise with his farm organization. Complementary use could be made of diverted acreage crops as feed inputs for livestock. Supplementary use could be made of unemployed resources. Livestock could utilize vacant land for pasture, off-season labor, and unused facilities such as buildings and water. But competitive aspects of the livestock enterprise would need to be considered too, since these would offset the gain accruing from the supplementary use. Competition would be likely for the use of labor in busy periods, for the use of capital and management, for the use of otherwise saleable feed, and for leisure time.

In planning his course of action and in order to arrive at the necessary decisions the farmer would balance one alternative against another relative to the criteria he was using. To compare anticipated performance of alternatives relative to income considerations the method he may be expected to use is a budgeting technique. Other comparisons such as competition for labor he might assess by outlining the prospective operating programs, but more than likely he will make the comparisons mentally. Once he makes a choice he will be free to commit himself to certain lines of

action. His systematic approach thus permits a relatively less complicated attack on the problem and provides some kind of solution upon which he may perhaps be able to rest with some confidence.

The Extension Worker's Approach

Faced with the problem of helping the farmer make an adjustment to the diverted acreage situation the extension worker would likely try to visualize himself in the farmer's position. In order to do this he would find it necessary to thoroughly familiarize himself with the environmental characteristics of the area. Then he would make an effort to look ahead and devise a profitable plan of operation that would best fit the anticipated circumstances. He might at this stage seek information relative to the problem from whatever research services were available. He would systematically study the alternatives in order to eliminate those that were unsuitable and learn what possibilities existed for favorable combinations. But the farmer's knowledge of his own situation and objectives are specific to his own case and less well known to the extension person who will for this reason only try to demonstrate how the farm operator may systematically appraise the alternatives which lie before him. Taking income maximization or loss minimization as the goal he will almost surely outline a budgeting attack on the problem which may guide the farmer to a solution.

The Research Approach

A research worker is in a detached position relative to the problem on the farm. The concern here is to lay out a methodology by which an

extension worker could demonstrate to farmers the value of a constructive analytical attack on the problem of selecting an alternative. The method needs to be one that farmers can use as well. The objectives of the research worker will include a desire to provide a method that is capable of producing a solution for each farmer which will be at or near the optimum point of production for the combination of resources applied. This would provide a contribution to farm efficiency which is bound to be disturbed by the application of acreage allotments to farms which have achieved any degree of equilibrium.

Technical methods.--Because of an interest in the farmer's point of view and in order to get a method most adaptable to his use, some form of budgeting is indicated. However, before proceeding with a consideration of this method the research worker would study the possible alternative methods for clues that might improve his analysis by illuminating strong and weak points of the alternatives. He might consider using a statistical technique such as was employed by Darrel F. Fienup in determining the relative productivities of certain factors of production on dry-land wheat farms. 1/ Fienup fitted a mathematical equation to his data which indicated various points on a production surface. By holding one group of variable inputs (resources) constant he was able to measure the elasticities of output with

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1/ Fienup, Darrell F., Resource Productivity on Montana Dry-Land Crop Farms, Montana State College Agricultural Experiment Station, Mimeo. Circular No. 66, (June, 1953).

respect to other resources segregated as independent variables. The percentage dollar return per dollar of input indicated the productivity of that input. Just how this method could be applied to the problem at hand concerning the productivities of enterprise combinations is a matter of conjecture. Possibly, since a large part of the resources on the farm would be constant whether used or not, the income from the different enterprise combinations could be expressed as a function of the receipts of each enterprise less the particular direct expenses associated with it.

Another method that might be considered is a mathematical device commonly called "linear programming." It is a form of "activity analysis" the use of which is well illustrated by James N. Boles as he proceeds to determine the optimum resourse allocations for farms faced with cotton acreage reductions. 2/ Essentially his method consists of so arranging his data that he is able to set down the per acre resource requirements and net cash return of each alternative enterprise segregated as a linear process yielding constant returns and having perfect divisibility of all inputs. The mathematical computations involved in the linear programming technique can then be used to determine which combination of enterprises would yield the highest net revenue within the restrictions applied.

Contrasted with these two technical approaches to the problem, the budget method of analysis is relatively simple in its mechanical aspects.

2/ Boles, James N., "Linear Programming and Farm Management Analysis," Journal of Farm Economics, Volume 37, (February, 1955).

Actually, the method, although widely used in research, may really be regarded as more of an extension tool since it is based on assumptions and represents expectations rather than facts. It consists of a relatively easy accounting procedure setting forth the inputs and outputs of each enterprise combination over specified time periods. Comparisons are made on the basis of the net farm income indicated, using estimated values thought to be most appropriate to the situation considering past experience and anticipations for the future.

Appraisal of alternative methods.--The limitations of the three methods mentioned are clearly compared by Richard A. King. 3/ The budget method compares each alternative as it exists at one specific point on its production surface. The main weakness here is that the point of comparison may not coincide with the position of optimum production for that particular combination of inputs. For the statistical approach, a sampling of a wide distribution of the various possible combinations presented by the production surface with a resultant relatively large number of observations is desirable in order to make possible the fitting of a mathematical equation to the data. From this, one may progress by calculation to determine an optimum point of production. This technique implies a forecast on the basis of past experience, a concept not entirely in keeping with this study which is concerned with alternative

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3/ King, Richard A., "Some Applications of Activity Analysis in Agricultural Economics," Journal of Farm Economics, Volume 35, (December, 1953).

combinations that may not have been tried prior to the imposition of wheat acreage controls. The linear programming technique assumes that each production process or alternative combination may be expressed in linear form, that is, the input-output ratios are constant. Also it is assumed that inputs which are left free to vary are perfectly divisible so that the production function may be continuous in nature. Further the different processes (enterprise combinations) which are to be combined need to be additive or amenable to non-conflicting simultaneous development. One has to assume that a marginal production surface does not exist--at least in so far as diagramming is concerned.

Which of these methods is selected for the analysis of any problem depends on the data available for use and the kind of problem to be dealt with. The statistical technique in this case is ruled out because the necessary observations have not been made under an acreage control situation in the wheat producing area under consideration, nor does the problem at this point appear amenable to solution by this method. In any case the method can hardly be considered suitable for use by a lay farmer who is not as well acquainted as the research worker with the requirements in mathematical computation, the segregation of independent variables, and the significance of tests of reliability. For the linear programming approach some of the same arguments may be used. First of all, data for the solution of a specific case have not been brought together, and secondly the mechanics of making the analysis are not understood by the operators of

farms into whose hands we wish to place some method of making a decision relative to the selection of alternatives.

Linear programming permits arrival near a point of optimum solution desirable from the farm efficiency stand point. However, this optimum is rigidly constrained by assumptions of linearity and divisibility, especially where processes are delineated which may lack these characteristics except for short sections of their production curves. J. D. Shaffer argued that most data emanating from the work of physical scientists is particularly suitable for linear programming since the great body of research done by experimental methods in agronomy, animal industry, and so on, deals with discontinuous segments (of production curves) which taken alone display considerable linearity. 4/ However, the very fact of discontinuity denies reasonable extension by extrapolation. Actually insufficient observations and extensions of experiments have been made, as a rule, to display the marginal characteristics of the whole production functions involved. Shaffer also points out that linear programming approximates the way in which farmers make decisions since they do not consciously include marginal analysis in their considerations. However, in order for a farmer to use this method a great deal of work would have to be undertaken in the preparation of tables and procedures for him to

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4/ Shaffer, J. D., "Discussion of 'Use of Economic Models'", Journal of Farm Economics, Volume 35, (December, 1953), pp. 849-851.

follow. Consequently, in the interests of simplicity and free understanding by lay users these two methods are abandoned for this study and we return to a consideration of the budget method.

Appraisal of the budget.--Generally speaking, farmers might be expected to shy away from mathematical or statistical approaches to their problems. However, as intimated previously, many farmers are familiar with budgeting in some form and they put considerable energy and thought into the process. It is a part of whatever native ability and know-how they have for farming or ranching. Any decision they make will require some balancing of pros and cons, particularly those which have a financial impact. The more systematic operators will reduce their deliberations to some kind of a balance sheet. Even without this, the mental budgeting processes engaged in will leave decision-making impressions in the minds of the operators. Their economic considerations will involve comparisons of past or anticipated experiences such as market prices, costs of production, and rates of yield, which are readily segregated. These same items, with others which are less obvious, enter into the more formal budgets set up by the professional analyst. Here then is common ground on which the farmer and farm management specialist can meet.

The budget method of analysis has a simplicity adaptable to the illustrative purpose of the work since a solution to a specific case is not sought. What is desired is a guide to the manner in which the manager of any specific farm might array the information available to him. He is not so concerned with an optimum combination for the different possibilities,

but with the best fit possible under the definite regidities which his own case presents. There may be only a relatively few points at which he can produce due to limitations of his equipment, acreages and kind of land, availability of labor, and so on. With these rigidities in mind the construction of a pertinent budget should demonstrate effectively the merits and demerits of the alternatives under consideration.

The budget itself may cover the whole farm operation, or if desired may be drawn up to deal with a specific phase of the organization. This contrasts with the tendency for an all-inclusive approach implied by statistical or linear programming methods. It would appear to be easier to introduce variations into the budget than into these systems in order to simulate conditions produced by changing economic environment. However, this simplicity does not make the method any more accurate. Data need to be refined to as high a degree as for other methods. Small mis-estimates in basic data may be so significant budget-wise as to distort conclusions seriously so that the problem of setting up satisfactory standards of tolerance is a serious one.

Use of the budget.--For this problem the budget is to be used for comparing enterprise alternatives as a step towards the selection of an enterprise for combination with winter wheat production. The characteristics of the alternatives to be compared are appraised according to the effect on the budgets as the different enterprises or resources are substituted. The basic budget need be changed only for those items for which variations are attributed to the substitution being made.

For farms in the central area of Montana specializing in wheat production the basic farm organization is built around a single enterprise crop production system. Prior to the introduction of acreage controls enterprise alternatives were not a matter of concern. Any budgeting necessary might have revolved around resource alternatives such as use of fertilizer, varying production techniques, additions to equipment, and changes in financial structure. Relatively simple changes, in production rates, and cost and inventory figures, where applicable, would have revealed in short order the probable effects of contemplated changes.

With imposition of wheat acreage reduction, the budget must take account of an additional factor, either the presence of idle acres or the combination and balance of an additional enterprise or enterprises. The budget needs an extension in the form of an operating plan to provide a means of appraising timing in the use of resources for which the enterprises might be competitive. The assessment of possibilities will remain fairly simple if the introduced change is an additional competitive cash crop or crops, requiring only appropriate alterations in the different sections of the basic budget.

However, if the contemplated alternative is of a complementary nature the changes necessary in the budget become more complex. Products may not be simply sold for cash but may re-enter the production process to emerge as an altogether different saleable product. There will be cash costs for one enterprise with no off-setting cash revenue, while these intermediate products assume the nature of non-cash costs for dependent production

processes which result in cash yielding products. The budget may need to be extended to take into account a longer period of time than a single crop production period. If the complementary enterprise involves the addition of livestock a section setting forth the livestock production system needs to be added, with corresponding extensions to the marketing or disposition section and cost and inventory sections of the budget.

To achieve efficiency, the combination (in the budget as well as in practice) then has to be brought into a balance which will allow for utilization of all intermediate unsaleable products. This balancing requires detailed knowledge not only of anticipated production rates but of such things as nutritive values and consumption requirements. Finally, accurate information about marketing the proposed products is desirable in order to assess the overall return of the proposed combination as it compares with possible alternatives.

PART IV

ILLUSTRATIVE BUDGET SUMMARIES

Synthesis of Case Farm Model

Examination of Tables II, III, and IV 1/ indicates that the predominant type of farm in the dryland farming area under consideration may be typified by a single enterprise extensive wheat producing unit. The normal size of such a unit is more difficult to visualize since the average farm acreages which may be calculated from Table II are enlarged by an indeterminate amount through the inclusion of livestock ranches. 2/ There are, however, two additional sources which give a better idea of the actual size of the grain farms in the triangle area. In the initial stages of research on this project, sixty records of representative farms were secured in 1949, of which twenty-one were operating with normal dryland practices and had less than ten head of livestock as well as no irrigated land. However, the average acreage for this small sample may be distorted by the extremes of the range covered. Perhaps a still better guide as to size of triangle wheat farms is the 1945 agricultural census master sample of dryland crop farms for census area VI. It indicates in its classification (five classes from one-half section or less to two sections or more) that no size group contains a significantly greater number of farms than any other, with the

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1/ Refer to Part I pages 26, 27, & 28.

2/ For the ten counties listed in Table II (page 26) the average size of all farms and ranches was 1688 acres in 1950.

possible exception of the group with 300 to 600 acres of cropland. Considering these sources, and on the basis of observations in the area a typical farm was thought to be one which might have about eight hundred 3/ cropland acres and about half this amount of unused land. Table V sets forth these figures. Total acreage in the case farm appears disproportionately low due to the smallness of the figure for waste land, which is held down so as to avoid consideration of livestock as part of the original farm organization. Percentage summerfallow for the case farm also diverges from the composite averages for actual farms since some do not always adhere to the half fallow system.

Table V.--Average dryland wheat farm acreages in the triangle area, according to source and date.

Source of Size Data	Total Acreage in Farm	Total Acres Cropland	Percent Summer-fallow	Acreage Waste or Pasture
Census area VI-21 farm survey records-1949	1469	1281	47.7	188
Census area VI-181 wheat farms-census master sample-1945	1357	672	43.2	685
Synthesized typical case farm	1160	800	50.0	360

3/ Myrick, D. C. and Anderson, R. L., in preliminary tabulations from ACP Listings sheets for 509 wheat producing farms in seven sample communities of area VI found in 1955 that the average size of farm was 1180 acres with 814 acres of cropland.

Further characteristics of this farm were then assumed. First, because of the prevalence of rented land in the area, it was considered that the unit would be more representative if 300 of the 800 acres of cropland were secured by lease, yielding one-third of the crop as rent. In line with conditions generally existing in the area, it was calculated that an average 10 percent of the seeded winter wheat acreage would be winter killed annually. Usually this acreage would be re-seeded to spring wheat. It was assumed that the farm would be located in an area in which it was normally feasible to seed all the summerfallow to winter wheat. The cropping system was assumed to be one in which wheat and summerfallow were alternated, with no stubble land being seeded. Thus, 400 acres of crop would be seeded each year, of which 150 acres would be on rented land. As indicated, the farm was assumed to carry no livestock, nor have facilities for accommodating livestock other than an adequate water supply and perhaps some nondescript unused buildings. A single line of owned farm equipment was assumed to be present and adequate to accomplish all the tasks of the grain farm in a timely and efficient manner. The farmer and his family were considered to be year-round residents on the farm, capable of handling the year's operations with the help of a man hired during the rush cropping seasons.

Sources of Data

The main source of data is the series of budgets developed by previous workers on this project. In these the inventory valuations of investment

in land, buildings, and machinery, as well as costs of operation, had been worked out on the basis of the survey material collected in 1949. For these basic budgets the price information was relevant for that period. From time to time as the study progressed, various items entered in these budgets were adjusted according to the contemporary index level for that item (1910-1914 = 100). This permitted an easy method of by-passing re-calculation of the inputs from year to year. However, the passage of time and then the introduction of a new base period (1935-1939 = 100) into the U. S. D. A. "Farm Cost Situation" 4/ made this practice less satisfactory. Consequently members 5/ of Production Economics Research Branch cooperating in this project re-worked the basic computations in line with 1955 prices. To avoid unnecessary duplication of work a number of these budgets are reproduced herewith. The yield data used are approximations of the average yield expected in the area as drawn from statistics of the Crop Reporting Service 6/. It is thought that the prices used for marketable products are those which may be anticipated during the 1955 season. Data basic to the turkey enterprise budget which is original with this

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4/ Farm Cost Situation, The, U. S. D. A. Bureau of Agricultural Economics.

5/ Anderson, R. L. and Myrick, D. C., Production Economics Research Branch, Marketing Service, U.S.D.A., Montana State College, Bozeman, Montana.

6/ Montana Agricultural Statistics, Montana Department of Agriculture Cooperating with U.S.D.A. Agricultural Marketing Service, Vol. 5, December, 1954.

thesis was drawn from publications of the Poultry Department 7/ and Extension Service 8/ of the college.

Basic Budgets

Triangle area wheat farm without acreage restrictions.--9/ This is budget I showing the organization, costs and returns that might have been basic for a farm similar to the model being used in this study. This assumes unrestricted wheat acreage and marketing, but a wheat price at the support level anticipated for 1955. Under surplus conditions this is an unrealistic condition which reflects a past situation but in no way represents the present or known future. This budget, therefore, does not illustrate a situation with which other alternatives should be directly compared except in so far as it represents a goal in level of net farm income which it is hoped the returns of these other alternatives may approach. However, Budget I is basic to the development of subsequent budgets because it incorporates all that is known about the case farm. Here we have inventories of acreages, current organization, investment in real estate and equipment, and expenses. These latter are developed directly from past experience as represented for instance by farm accounts and survey material. From this known base, projections into the unknown can be made by ensuing budgets.

7/ Halbrook, E. R., Beeckler, A. F., and Smith, E. P., Turkey Feeding Research, Montana Agricultural Experiment Station, Bulletin 501, (September, 1954).

8/ Cushman, Hariette E., and Welch, Dr. Howard, Turkeys in Montana, Montana State College Extension Service, Bulletin 248, (November, 1947).

9/ See Appendix A for detailed development of Budget I.

Budget I.--Triangle area wheat farm without acreage restrictions.

LAND USE AND CROP PRODUCTION

Crops & Land Use	Acres	Yield	Production	Disposition				Cash Income	
				Feed	Seed	Rent	Sold	Price	Total
Winter wheat	400	18.0	7200 bu.	xx	400	900	5900	$1.895	$11180
Spring wheat	(40)	13.5	540 bu.	xx	40	67	433	1.93	853
Summer fallow	400								
Native pasture	325								
Farmstead & waste	35								
TOTAL	1160								$12015

CASH EXPENSE

Item	Amount
Fuel, oil & grease	$815
Repairs	914
Seed	--
Seed treatment	32
Weed spraying	414
Insecticides	--
Fertilizer	--
Hired labor	688
Custom hauling	242
Supplies & misc.	345
Livestock purchases	xx
Feed purchases	xx
Insurance	112
Taxes	324
Interest paid	295
TOTAL CASH EXPENSE	$4181

FINANCIAL SUMMARY

Cash Income		
Grain.....		$ 12015
Livestock.....		$ --
Other.....		$ --
Total Cash Income		$ 12015
Total Cash Expense	-	$ 4181
NET CASH Income		$ 7834
Depreciation	-	$ 1728
NET FARM Income		$ 6106
Interest on Equity @ 5.0 %	-	$ 1474
LABOR AND MANAGEMENT Income		$ 4632

INVESTMENTS

Item	Value		Depreciation	
	Total	Equity	Ave. rate	Amount
Land	$ 11900	$ 9917	--	--
Buildings & fences	5130	4275	3.33 %	$ 170
Machinery & power	18340	15283	8.5 %	1558
Livestock	xx	xx	--	--
TOTAL	$ 35370	$29475	xx	$1728

Triangle area wheat farm with acreage restriction and diverted acreage idle.--10/Budget II represents the case farm operating under a 25 percent reduction in wheat acreage with diverted acreage idle. Because the price of wheat is guaranteed through compliance with a known acreage allotment this situation is an alternative which provides a realistic standard with which other alternatives may be compared. This budget may be developed from Budget I by a substitution process. The changes in the land use and crop production section follow as a matter of course the basic change from 400 to 300 acres of wheat. The variable expenses can also be changed readily in the same proportion as the basic change in wheat acreage, while fixed expenses and the investment section remain unchanged. One feature of Budget II will remain constant through the ensuing budgets, this being the acreages allocated to winter and spring wheat with the dependent schedules of items relative to production, disposition, and income from wheat.

Budgets for Cropping Alternatives

Diverted acreage in barley.--This alternative, illustrated by Budget III,11/ in the land use and crop production section requires only one basic change from foregoing budgets. In place of 100 acres of wheat or idle land, as the case may be, there will be 100 acres of barley. This crop, following the established system, will be offset by 100 acres of summerfallow. In

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10/ See Appendix A for additional detail on Budget II.

11/ See Appendix A for additional detail on Budget III.

Budget II.--Triangle area wheat farm with diverted acreage idle.

LAND USE AND CROP PRODUCTION

Crops & Land Use	Acres	Yield	Production	Disposition				Cash Income	
				Feed	Seed	Rent	Sold	Price	Total
Winter wheat	300	18.0	5400 bu.	xx	300	675	4425	$1.895	$8385
Spring wheat	(30)	13.5	405 bu.	xx	30	51	324	1.93	625
Summer fallow	300								
Idle	200								
Native pasture	325								
Farmstead & waste	35								
TOTAL	1160								$9010

CASH EXPENSE

Item	Amount
Fuel, oil & grease	$612
Repairs	686
Seed	--
Seed treatment	24
Weed spraying	311
Insecticides	--
Fertilizer	--
Hired labor	344
Custom hauling	182
Supplies & misc.	259
Livestock purchases	xx
Feed purchases	xx
Insurance	112
Taxes	324
Interest paid	295
TOTAL CASH EXPENSE	$3149

FINANCIAL SUMMARY

Cash Income		
Grain.....	$	9010
Livestock.....	$	--
Other.....	$	--
Total Cash Income	$	9010
Total Cash Expense	- $	3149
NET CASH Income	$	5861
Depreciation	- $	1728
NET FARM Income	$	4133
Interest on Equity @ 5.0%	- $	1474
LABOR AND MANAGEMENT Income	$	2659

INVESTMENTS

Item	Value		Depreciation	
	Total	Equity	Ave. rate	Amount
Land	$ 11900	$ 9917	--	--
Buildings & fences	5130	4275	3.33 %	$ 170
Machinery & power	19340	15283	8.5 %	1558
Livestock	xx	xx	--	--
TOTAL	$ 35370	$29475	xx	$1728

Budget III.--Triangle area wheat farm with diverted acreage in barley.

LAND USE AND CROP PRODUCTION

Crops & Land Use	Acres	Yield	Production	Disposition				Cash Income	
				Feed	Seed	Rent	Sold	Price	Total
Winter wheat	300	18.0	5400 bu.	xx	300	675	4425	$1.895	$ 8385
Spring wheat	(30)	13.5	405 bu.	xx	30	51	324	1.93	625
Summer fallow	400								
Barley	100	27.8	2780 bu.	xx	125	348	2307	.85	1961
Native pasture	325								
Farmstead & waste	35								
TOTAL	1160								$10971

CASH EXPENSE

Item	Amount
Fuel, oil & grease	$ 815
Repairs	914
Seed	--
Seed treatment	32
Weed spraying	414
Insecticides	--
Fertilizer	--
Hired labor	688
Custom hauling	268
Supplies & misc.	345
Livestock purchases	xx
Feed purchases	xx
Insurance	112
Taxes	324
Interest Paid	295
TOTAL CASH EXPENSE	$4207

FINANCIAL SUMMARY

Cash Income		
Grain		$ 10971
Livestock		$ --
Other		$ --
Total Cash Income		$ 10971
Total Cash Expense	-	$ 4207
NET CASH Income		$ 6764
Depreciation	-	$ 1728
NET FARM Income		$ 5036
Interest on Equity @ 5.0%	-	$ 1474
LABOR AND MANAGEMENT Income		$ 3562

INVESTMENTS

Item	Value		Depreciation	
	Total	Equity	Ave. rate	Amount
Land	$ 11900	$ 9917	--	--
Buildings & fences	5130	4275	3.33 %	$ 170
Machinery & power	18340	15283	8.5 %	1558
Livestock	xx	xx	--	--
TOTAL	$ 35370	$29475	xx	$1728

practice this organization should utilize the resources of the wheat farm to the same degree that would be the case of the unrestricted wheat operation. Consequently, cash expenses are considered not to differ greatly from the situation laid out in Budget I. However, changes in the operating program will be necessitated by the spring habit of barley in contrast with the winter habit of wheat common to the area.

Diverted acreage in crested wheat grass for seed.--Budget IV, on the face of it, indicates little difference from the preceding budgets other than in the distribution of diverted acreage. However, this is a tip-off to the new factor which is involved. The previous budgets described situations which were flexible from year to year because of the annual nature of cereal crops. 12/ This budget is for a less flexible situation because the perennial nature and growth habits of crested wheat grass require commitments of resources (chiefly land) for about two years before a cash crop can be realized. Consequently in order to make this budget comparable with the others, the time element must be disregarded. It can then be assumed that the budget represents a farm with the crested wheat grass enterprise in full production. Under these conditions variable operating expenses for land work should be somewhat less than for cereal crops due to reduced summerfallow and seeding effort. This saving will be partially offset by the costs of harvesting a greater acreage. Again the operating program

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12/ For discussion of "time flexibility" see E. O. Heady, Economics of Agricultural Production and Resource Use, New York, Prentice-Hall, Inc. (1952) pp. 524-525.

Budget IV.--Triangle area wheat farm with diverted acreage in crested wheat grass for seed.

LAND USE AND CROP PRODUCTION

Crops & Land Use	Acres	Yield	Production	Disposition				Cash Income	
				Feed	Seed	Rent	Sold	Price	Total
Winter Wheat	300	18.0	5400 bu.	xx	300	615	4425	$1.895	$8385
Spring Wheat	(30)	13.5	405 bu.	xx	30	51	324	1.93	625
Summer fallow	300								
Crested Wheat Grass									
-Seed crop	160	125#	20,000#	xx	200#	2500#	17300#	.15	2595
-New seeding	40								
Native pasture	325								
Farmstead & Waste	35								
TOTAL	$1160								$11605

CASH EXPENSE

Item	Amount
Fuel, oil & grease	$ 676
Repairs	731
Seed	--
Seed treatment	24
Weed spraying	414
Insecticides	--
Fertilizer	--
Hired labor	466
Custom hauling	182
Supplies & misc.	302
Livestock purchases	xx
Feed purchases	xx
Seed cleaning	692
Insurance	112
Taxes	324
Interest paid	295
TOTAL CASH EXPENSE	$4218

FINANCIAL SUMMARY

Cash Income	
Grain	$11605
Livestock	$ --
Other	$ --
Total Cash Income	$11605
Total Cash Expense	- $ 4218
NET CASH Income	$ 7387
Depreciation	- $ 1728
NET FARM Income	$ 5659
Interest on Equity @ 5.0%	- $ 1474
LABOR AND MANAGEMENT Income	$ 4185

INVESTMENTS

Item	Value		Depreciation	
	Total	Equity	Ave. rate	Amount
Land	$11900	$ 9917	--	--
Buildings & fences	5130	4275	3.33%	$ 170
Machinery & power	18340	15283	8.5 %	1558
Livestock	xx	xx	--	--
TOTAL	$35370	$29475	xx	$ 1728

will have to be changed, particularly in respect to distribution of labor. Marketing uncertainty will be introduced relative to quality (e.g. contamination by quack grass) and a price which is not fixed. However, it is thought that the uncertainty of securing a strong catch of the grass on newly seeded fields will be mitigated by the capacity of the crop to produce high seed yields from thin stands.

Budgets for Livestock Alternatives

The four livestock budgets to be presented have general features which are similar. As in previous budgets all are consistent in having the same amount of land allocated to cash wheat production. Diverted acreage is utilized in the first two mainly for annual feed grain production, in the others largely for forage production. Crop production expenses therefore remain within the range observed for the previously considered cropping budgets. Crop cash income is reduced to that which is forthcoming from wheat alone, or little more. Three budgets out of the four contemplate use of a hitherto unemployed land resource, the uncropped pasture land.

Further characteristics common to these livestock budgets are the addition of sections describing inventory, feed requirements, production, and disposition of livestock. In each case the cash expense section has to take account of direct livestock expenses. The investment section indicates required additions to real estate in buildings and fences and to working capital in equipment and livestock. Each one of these livestock

operations exhibits a diversification with some degree of inflexibility 13/ which is not fully reflected in the budgets. For the turkey and hog enterprises commitments of resources for producing feed grain have to be made a year before the livestock product can be put out at a seasonable time. For sheep and cattle this delay in getting into full production may be even longer relative to establishing an adequate forage production base. At the same time consideration needs to be given to the longer period required by these livestock for breeding and growth. To make the budgets comparable it is assumed that the enterprise organizations dealt with have had adequate time to develop up to the equilibrium positions conceived therein.

However, the writer realizes that this is an unrealistic approach in view of the year to year imposition of acreage controls which in effect demands flexibility of operation on an annual basis. The implication is that the operator would have had foresight enough to anticipate the acreage allotment or else the current situation will persist through the production periods necessary to bring the alternative enterprises into the equilibrium positions visualized in these budgets. A realistic treatment would involve constructing a series of transition budgets to approximate the developmental conditions anticipated for the production periods intervening between the

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13/ Contrasting diversification with flexibility in the face of uncertainty Heady says in part, "Diversification is mainly a method of preventing large losses; flexibility is more nearly a method of preventing the sacrifice of large gains. 'Flexibility allows for changing of plans as time passes.....'quick changes' at a lower cost sacrifice..... turning points in time for redecision....." E. O. Heady, op. cit. p. 524.

current stage and the equilibrium aimed at. Then comparisons could be made on the basis of the aggregate results of each enterprise for the period under consideration. This study will not be extended to include this approach.

Diverted acreage as a base for a turkey enterprise.-- 14/ Budget V is a highly speculative projection since a number of unknowns and uncertainties are involved. Regarding crop production, wheat is the most desirable feed grain for turkeys. Yet under existing regulations it is required to be grown on allocated acres, which are, for this series of budgets, restricted to the production of wheat for sale. Consequently, a wheat substitute has been sought such as millet, speltz, grain sorghum, or even hulless oats and barley. Not enough is known about the performance and adaptation of such crops as turkey feed or for the area. Added investment would be required for shelter and feeding facilities as well as for equipment to grind and mix feed. It is assumed that adequate cash reserves and/or intermediate credit is available to provide these needs. Insofar as crop production is concerned it is thought that expenses will be the same as for all grain operations. However, additional expenses will accrue from the greater use of power equipment (truck, tractor, feed grinder) in the daily tasks of looking after the turkeys. Because the birds likely will not appear on tax rolls no change in taxes is contemplated. However, the three large

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14/ See Appendix A for detailed development of Budget V.

Budget V.--Triangle area wheat farm with diverted acreage as a base for a turkey enterprise.

LAND USE AND CROP PRODUCTION

Crops & Land Use	Acres	Yield	Production	Disposition				Cash Income	
				Feed	Seed	Rent	Sold	Price	Total
Winter wheat	300	18.0	5400 bu.	--	300	615	4425	$1.895	$8385
Spring wheat	(30)	13.5	405 bu.	--	30	51	324	1.93	625
Summer fallow	400								
Millet	50	1000#	50,000#	43000#	750#	6250#			
Barley	20	27.8	556 bu.	461	25	70			
Oats	30	28.2	846 bu.	680	60	106			
Native pasture	325								
Farmstead & waste	35								
TOTAL	$1160								$9010

CASH EXPENSE

Item	Amount
Fuel, oil & grease	$ 925
Repairs	989
Seed	--
Seed treatment	33
Weed spraying	362
Insecticides	--
Fertilizer	--
Hired labor	1488
Custom hauling	182
Supplies & misc.	437
Livestock purchases	1700
Feed purchases	2566
Insurance	112
Taxes	324
Interest paid	434
TOTAL CASH EXPENSE	$9552

FINANCIAL SUMMARY

Cash Income		
Grain.		$ 9010
Livestock.		--
Other.		$ 7895
Total Cash Income		$16905
Total Cash Expense	-	$ 9552
NET CASH Income		$ 7353
Depreciation	-	$ 1863
NET FARM Income		$ 5490
Interest on Equity @ 5.0%	-	$ 1608
LABOR AND MANAGEMENT Income		$ 3882

INVESTMENTS

Item	Value		Depreciation	
	Total	Equity	Ave. rate	Amount
Land	$11900	$ 9917	--	--
Buildings & fences	7860	6550	3.33%	$ 261
Machinery & power	18840	15700	8.5 %	1602
Livestock	--	--	--	--
TOTAL	$38600	$32167	xx	$1863

(cont.)

Budget V.--(cont.)

LIVESTOCK ORGANIZATION

Kind	Begin No.	Born No.	Bought No.	Home Use	Died	Disposition					End No.
						Sales					
						No.	Weight	Amount	Price	Value	
Turkey Poults (Broad Breasted Bronze)	--	--	2000	--	240	xx	xx	xx	xx	xx	--
TOTAL											

LIVESTOCK FEED REQUIREMENTS

Kind	No. Head	Grain Lbs.	Concentrates Lbs.		Pasture Acres	
					Native	Planted
B. B. Bronze Turkeys	2000	Millet 43000	Pre-starter	2000		
			Turkey starter	10000		
			Grower Mash	8000		
		Barley 22128	Bran	6000		
			Soy meal	6000		
		Oats 28764	Dried skim	4000		
			Fish meal	2500		
			Meat scrap	3500		
			Other supplements	3000		
TOTAL		113892		45000	100	--

LIVESTOCK PRODUCTS

Product	No. of head	Production rate	Total production	Home Use	Farm Use		Sold Amt.	Price	Value
					For	Amt.			
Toms	880	22#	19360#	110#	--	--	17900#	$.25	$4475
Hens	880	14#	12320#	70#	--	--	11400# (Less 7% shrink)	.30	3420
TOTAL									$7895

cash items of labor, purchase of poults, and purchase of supplemental concentrate feeds, pose a critical problem in this enterprise. These about double the cash expenditures normal for cropping. All these expenses have to be met in large part prior to any possible receipts from flock or current crop wheat sales. The susceptibility of turkeys to unfavorable events makes the flock itself poor collateral even for short term borrowings. Because wheat also is an uncertain crop these cash demands would be likely to place the operator in a sufficiently extenuating financial position that the turkey enterprise would be prohibited unless there were substantial cash reserves to put into the venture. Consequently only a relatively modest addition is made to interest on account of short term borrowings to meet direct cash expenses.

Also not readily revealed by the budget is a highly complex operating program. The changes in cropping system alone will not be easy to forecast. Added to this would be a greatly increased demand for labor, both family and hired, to look after the turkeys through slack and busy times. 15/ Timing will be important in working out as smooth an organization as possible between the competitive features of the combined crop and turkey enterprises, particularly in respect to labor use.

Diverted acreage as a base for hog enterprise.--Hog production, as can be learned from Budget VI, offers a relatively problem free alternative.

15/ The possibility of securing partly raised poults ready to go on range should not be overlooked. The additional cost would be offset by savings in mortality, starter feeds, labor, and investment in brooder houses and equipment.

Budget VI.--Triangle area wheat farm with diverted acreage as a base for a hog enterprise.

LAND USE AND CROP PRODUCTION

Crops & Land Use	Acres	Yield	Production	Disposition				Cash Income	
				Feed	Seed	Rent	Sold	Price	Total
Winter wheat	300	18.0	5400 bu.	--	300	675	4425	$1.895	$8385
Spring wheat	(30)	13.5	405 bu.	--	30	51	324	1.93	625
Summer fallow	390								
Barley	90	27.8	2502 bu.	1328	112	348	714	.85	607
Alfalfa hog pasture	20								
Native pasture	325								
Farmstead & waste	35								
TOTAL	1160								$9617

CASH EXPENSE

Item	Amount
Fuel, oil & grease	$ 815
Repairs	914
Seed	--
Seed treatment	32
Weed spraying	414
Insecticides	--
Fertilizer	--
Hired labor	688
Custom hauling	208
Supplies & misc.	430
Livestock purchases	60
Feed purchases	358
Insurance	112
Taxes	336
Interest paid	321
TOTAL CASH EXPENSE	$4688

FINANCIAL SUMMARY

Cash Income	
Grain	$9617
Livestock	2363
Other	--
Total Cash Income	$11980
Total Cash Expense	- $4688
NET CASH Income	$7292
Depreciation	- $1862
NET FARM Income	$5430
Interest on Equity @ 5.0%	- $1632
LABOR AND MANAGEMENT Income	$3798

INVESTMENTS

Item	Value		Depreciation	
	Total	Equity	Ave. rate	Amount
Land	$11900	$9917	--	--
Buildings & fences	7810	6515	3.33%	$ 260
Machinery & power	18840	15700	8.5%	1602
Livestock	500	500	--	--
TOTAL	$39050	$32632	xx	$1862

(cont.)

Budget VI.--(cont.)

LIVESTOCK ORGANIZATION

Kind	Begin No.	Born No.	Bought No.	Home Use No.	Died No.	Disposition					End No.
						Sales					
						No.	Weight	Amount	Price	Value	
Sows	11	--	0	--	--	11	320#	3520#	$.12	$422	--
Boar	--	--	1	--	--	1	275#	275#	.12	33	--
Slaughter hogs	--	66	--	1	1	53	200#	10600#	.18	1908	11
TOTAL										$2363	

LIVESTOCK FEED REQUIREMENTS

Kind	No. Head	Grain Lbs.	Hay, Tons		Concentrates Lbs.		Pasture Acres	
			Native	Tame			Native	Planted
Sows	11	16160		1.1	Tankage Soy meal	440 440		
Boar	1	1200		.1	Tankage Soy meal	40 40		
Spring pigs	66	43700		.8	Tankage Soy meal Bone meal Salt	950 2380 400 300		
TOTAL		61060		2.0				20

Investment in working capital is modestly increased and new cash expenses likewise are moderate enough to be easily met even if through the use of credit. The simple cropping system differs from Budget III only in having slightly less barley so as to leave a few acres for hog pasture. With a

one litter system of production from home-raised gilts problems of caring for the herd are minimized. 16/

Diverted acreage as a base for a sheep enterprise.--Here in Budget VII several features emerge which make this enterprise less flexible than the preceding operations. In the cropping system, long term (for land) commitments must be made to provide hay and pasture. At the same time the rented land needs to be segregated in a use satisfactory to the landlord. There will need to be a long term investment in fence and shelter structures. A modest investment in working capital (haying equipment and a flock of ewes) will be needed. The collateral value of these assets should present no credit difficulties if loan funds are required to secure them. The flock of ewes will require some additional cash expenses such as for replacements, shearing, and fence repairs but these should not result in financing obstacles since there are nearly concurrent sales of lambs or wool. This enterprise, however, will place a heavy burden on family labor and management because of the critical characteristics of the undertaking. For instance, timing will be important relative to breeding, lambing, and shearing to avoid labor competition with cropping enterprises. Also pest control, culling, and marketing will have an important bearing on success and will require serious attention.

16/ This system may result in somewhat lower farrowing rates. The alternative is to maintain a herd of sows year in and year out at a somewhat higher cost. With adequate facilities two litters per sow could be raised each year.

Budget VII.--Triangle area wheat farm with diverted acreage as a base for a sheep enterprise.

LAND USE AND CROP PRODUCTION

Crops & Land use	Acres	Yield	Production	Disposition				Cash Income	
				Feed	Seed	Rent	Sold	Price	Total
Winter wheat	300	18.0	5400 bu.	--	300	675	4425	$1.895	$8385
Spring wheat	(30)	13.5	405 bu.	--	30	51	324	1.93	625
Summerfallow	337.5								
Barley	37.5	27.8	1042 bu.	215	47	347	433	.85	368
C.W.G. new seeding	20								
C.W.G. hay	42	1700#	35.7 T.	33.4T					
C.W.G. pasture	63								
Native pasture	325								
Farmstead & waste	35								
TOTAL	1160								$9378

CASH EXPENSE

Item	Amount
Fuel, oil & grease	$ 764
Repairs	914
Seed	32
Seed treatment	30
Weed spraying	364
Insecticides	--
Fertilizer	--
Hired labor	602
Custom hauling	198
Supplies & misc.	345
Livestock purchases	760
Feed purchases-salt	25
Veterinary supplies	85
Shearing & tagging	65
Fence repairs	216
Insurance	112
Taxes	352
Interest paid	337
TOTAL CASH EXPENSE	$5201

FINANCIAL SUMMARY

Cash Income	
Grain	$ 9378
Livestock	$ 2004
Other	$ 718
Total Cash Income	$12100
Total Cash Expense	- $ 5201
NET CASH Income	$ 6899
Depreciation	- $ 1881
NET FARM Income	$ 5018
Interest on Equity @ 5.0 %	- $ 1685
LABOR AND MANAGEMENT Income	$ 3333

INVESTMENTS

Item	Value		Depreciation	
	Total	Equity	Ave. rate	Amount
Land	$11900	$ 9917	--	--
Buildings & fences	8391	6993	3.33 %	$ 279
Machinery & power	18840	15700	8.5 %	1602
Livestock	1300	1084	--	--
TOTAL	$40431	$33694	xx	$1881

(cont.)

Budget VII.-- (cont.)

LIVESTOCK ORGANIZATION

Kind	Begin No.	Born No.	Bought No.	Home Use No.	Died No.	Disposition					End No.
						Sales					
						No.	Weight	Amount	Price	Value	
Ewes	100	--	55	--	8	47	125#	5875#	$.05	$294	100
Lambs	--	112	--	--	8	104	90#	9360#	.18	1685	--
Bucks	2	--	2	--	1	1	--	--	25.00	25	2
Total										$2004	

LIVESTOCK FEED REQUIREMENTS

Kind	No. Head	Grain Lbs.	Hay, Tons		Concentrates Lbs.	Pasture Acres	
			Native	Tame		Native	Planted
Ewes	104	8300		32.1			
Bucks	2	160		.8			
Lambs	104	1860		.5			
TOTAL		13040		33.4		325	83

LIVESTOCK PRODUCTS

Product	No. of head	Production rate	Total production	Home Use	Farm Use		Sold Amt.	Price	Value
					For	Amt.			
Wool	100	10.4	1040	--	--	--	1040	$.67	$696
Wool	2	16.0	32	--	--	--	32	.67	22
TOTAL									$ 718

Diverted acreage as a base for a cow-calf enterprise.--Budget VIII has a cropping system similar to the foregoing sheep budget and thereby is equally inflexible relative to the crop base. Investment in buildings and fences, equipment, and livestock shifts upward substantially for this enterprise.

Budget VIII.--Triangle area wheat farm with diverted acreage as a base for cow-calf enterprise.

LAND USE AND CROP PRODUCTION

Crops & Land Use	Acres	Yield	Production	Disposition				Cash Income	
				Feed	Seed	Rent	Sold	Price	Total
Winter wheat	300	18.0	5400 bu.	--	300	675	4425	$1.895	$8385
Spring wheat	(30)	13.5	405 bu.	--	30	51	324	1.93	625
Summer fallow	337.5								
Barley	37.5	27.8	1042 bu.	200	47	347	458	.85	389
C.W.G.new seeding	20								
C.W.G. hay	42	1700#	35.7 T	35.7T					
C.W.G. pasture	63								
Native pasture	325								
Farmstead & waste	35								
TOTAL	1160								$9399

CASH EXPENSE

Item	Amount
Fuel, oil & grease	$ 764
Repairs	914
Seed	32
Seed treatment	30
Weed spraying	364
Insecticides	--
Fertilizer	--
Hired labor	602
Custom hauling	198
Supplies & misc.	345
Livestock purchases	100
Feed purchases-salt	20
Hay	60
Veterinary supplies	20
Insurance	112
Taxes	391
Interest paid	372
TOTAL CASH EXPENSE	$ 4324

FINANCIAL SUMMARY

Cash Income	
Grain	$ 9399
Livestock	$ 1683
Other	$ --
Total Cash Income	$11082
Total Cash Expense	- $ 4325
NET CASH Income	$ 6758
Depreciation	- $ 2023
NET FARM Income	$ 4375
Interest on Equity @ 5.0%	- $ 1899
LABOR AND MANAGEMENT Income	$ 2836

INVESTMENTS

Item	Value		Depreciation	
	Total	Equity	Ave. rate	Amount
Land	$11900	$9917	--	--
Buildings & fences	10607	8840	3.33%	$ 353
Machinery & power	19140	15950	8.5%	1670
Livestock	3775	3280	--	--
TOTAL	$45422	$37987	xx	$2023

(cont.)

Budget VIII. (cont.)

LIVESTOCK ORGANIZATION

Kind	Begin No.	Born No.	Bought No.	Home Use No.	Died No.	Disposition					End No.
						Sales					
						No.	Weight	Amount	Price	Value	
Cows	23	--	--	--	1/2	2½	1100#	2750#	$ .10	$275	20
Bull	1	--	1/3	--	--	1/3	1450#	483#	.12	58	1
Calves	--	23	--	--	2	18	375#	6750#	.20	1350	3
Yearlings	3	--	--	--	--	--	--	--	--	--	3
2 year olds	3	--	--	--	--	--	--	--	--	--	3
Total										$1683	

LIVESTOCK FEED REQUIREMENTS

Kind	No. Head	Grain Lbs.	Hay, Tons		Concentrates Lbs.	Pasture Acres	
			Native	Tame		Native	Planted
Cows	20	6000		28.5			
Bull	1	300		1.5			
Calves	23	1800		2.25			
Yearlings	3	600		3.15			
2 year olds	3	900		3.15			
Total		9600		38.5		325	83

However, collateral value of these additions both for long-term and intermediate loan funds is good. By contrast cash operating expenses are less than for other kinds of livestock. The operating program is simple and may be considered as less competitive than other livestock enterprises for labor during the cropping season. Cattle, too, may be less sensitive to unfavorable events than other livestock and actually the greater investment

in them constitutes a form of reserve as insurance against crop losses. These characteristics are offset by the lower annual return anticipated for this enterprise which results from the decidedly longer period required for turn-over.

PART V

THE BUDGET IN DECISION-MAKING

Intra-Budget Selections

The budgets already described may be regarded as the culmination of the detailed study which a farmer, extension demonstrator, or research worker, might give to the alternatives which he proposes to compare. 1/ Each budget may be described as an organized set of assumptions. These assumptions may be a reproduction of the facts of past experience such as the yield or price of a crop product thought to be representative of the situation anticipated by the budget. Or they may represent things known with a high degree of certainty like fixed support prices. On the other hand many assumptions of a purely speculative nature may have been introduced into the budget in order to study the effect of different levels of yield or price. Thought of in this way each budget takes on the character of a trial balloon.

Even though the procedure followed might have been laid out in extreme detail and very exact relevant information made available, the synthesis of the simplest budget will have required innumerable selections to be made from among a mass of alternative assumptions. Item by item the budgeter must examine, and accept or reject, those that are pertinent. For instance a choice has to be made relative to the capital valuations and the depreciation and interest rates that would be used in connection with the budget

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1/ See Appendix A.

series. Some choice has to be made in order to settle on which of different variants in operating plans would be figured on in each tentative organization. Technical production information has to be considered so as to determine whether spraying expenses would be included or excluded for different kinds of crops, or what feeding rations could be best utilized for livestock. Budgeting, no less than other methods of analysis, draws attention to myriads of these lesser problems of decision which must be settled for every item considered before any calculation may be completed.

To achieve a complete budget, the budgeter is forced into a comprehensive and critical consideration of the subject under study. Right from the start then the budget tends to become a conditioning process rather than a mechanical means of securing an answer by feeding in data and pulling out solutions. Actually, in the course of completing these budgets it will become difficult not to draw some tentative conclusions relative to individual alternative enterprises. The budget thus becomes a vehicle for framing a plan of organization based on the assumptions thought most likely to fit the circumstances anticipated for the period in mind. It is the development of a farm plan on the basis of the assumptions of the budget which call for decision to be made in the consummation of a relevant line of action.

Inter-budget Decisions

Prior to and in the course of budgeting, the budgeter will establish certain standards which he expects to use in measuring the comparative merits of the various alternatives. Having developed a series of budgets,

the next step is to array the data which are pertinent to selection of the best or most suitable alternatives according to these criteria. He may well start out with a single criterion upon which he expects to depend in making his selection. Suppose this is simply the maximization of monetary income, without any clear distinction as to whether decision is to be based on gross or net cash, or some other income measure. Then he is likely to come up with an array comparable to Table VI which displays the monetary relationships of the eight alternatives.

The budgeter may tend to regard Alternative I as representing a position which wheat acreage restriction prevents the farm operator from attaining. The differences between Alternative I and Alternative II will appear to represent a prospective loss of income. Now reverting for a moment to pre-budget decisions this "felt" problem in the case of the farm operator has led to the development of such an array of budgets. For the farmer this is an important decision in itself, involving recognition of a problem and his determination to seek a solution. His first move may have been to cast around in search of supplementary crop enterprises which could profitably utilize the idle acres. Along the way he has decided that the environment is such that he can also consider the supplementary-complementary livestock enterprises used as examples. The resultant budgets are elaborations of hypothetical solutions to his problem. 2/ Table VI

2/ Larrabee, H. A., Reliable Knowledge, Houghton Mifflin Co., New York, (1945), p. 126.

Table VI.--Financial summary for diverted acreage alternatives on a triangle area wheat farm.

Enterprise Alternatives	Gross Cash Income	Cash Farm Expense	Net Cash Income	Depreciation	Net Farm Income	Interest on Investment	Labor & Management Income
Crop				- Dollars -			
Unrestricted wheat (I)	12015	4181	7834	1728	6106	1474	4632
Diverted acres idle (II)	9010	3149	5861	1728	4133	1474	2659
Barley combination (III)	10971	4207	6764	1728	5036	1474	3562
Cr. wh. gr. combination (IV)	11608	4218	7387	1728	5659	1474	4185
Livestock							
Turkey combination (V)	16905	9552	7353	1863	5490	1608	3882
Hog combination (VI)	11980	4688	7292	1862	5430	1632	3798
Sheep combination (VII)	12100	5201	6899	1881	5018	1685	3333
Cow-calf combination (VIII)	11082	4324	6758	2023	4735	1899	2836

then represents the test of these hypotheses. Upon this test the farmer will plan to make a decision.

Suppose he decides to settle on a net farm income as the indicator to use. His observation upon this basis would be that any of these alternatives could be used to recover a portion of the anticipated loss of income. Some alternatives, however, appear to be better than others. It is possible that at this point he will sense the need of additional criteria before he can make a final selection.

Although these budgets, on the basis of present knowledge, reveal a relatively satisfactory prospective financial return, would this be secure? What variation in net farm income might one expect from year to year due to changing product prices and the exigencies of production?

Reflecting on the budgets and searching Table VI for additional clues he might recall that one of the less attractive alternatives financially was based on more certain data (e.g. the support price of barley). Also he would recollect that the livestock and crested wheat grass budgets required more than a one year period to complete their production cycles.

Perhaps a more adequate basis for decision on these points would be obtained if a series of budgets were set up involving various price and yield assumptions over time for each of these alternatives. Yet this may tend to create further obstacles to decision by multiplying the number of possible choices and incorporating wider ranges and combinations of uncertainty.

The budgeter may note from Table VI the variation between alternatives in the amounts of cash farm expense which each requires. This too may promote decision depending on the relative anticipated availability of cash in the season when it will be needed.

Continuing these financial considerations, he might make his selection from among the alternatives on the basis of his preference between a relatively low but sure income, as represented by the barley combination, and a higher but more uncertain prospect, as offered by the turkey enterprise. Yet at the same time he may feel insecure in the resultant decision because the monetary comparisons have not served to express all the differences between these alternatives.

Extra-Budget Decisions

Having exhausted the major possibilities for decision-making which resulted from a direct monetary comparison of the budgets, the budgeter may delve into a comparison of other characteristics of the enterprises themselves. These may be in the realm of personal preferences or associated with operating features pertaining to each enterprise. He would recognize that an operator may readily, at any cost, decide against turkeys because he can't abide their stupidity, or crested wheat grass because it is too much trouble adjusting the combine and sacking and marketing the seed. Or perhaps the farmer's wife cannot tolerate the smell of pigs in the yard or the persistent bleating of sheep.

Items such as these permit decisive negation of some alternatives without the necessity of budgeting. Other determinants are less easy to isolate. For instance, having settled on some enterprise, he may discover, in synthesizing a stable management plan, that it has a feature which makes it irreconciliably competitive with the dominant wheat enterprise, however suitable it may otherwise be. Such a feature may be the competition of the turkey enterprise for liquid funds or short term credit to meet cash expenses.

The budgeter may probe into less tangible areas of conscious decision origination, which for different individuals will have varying degrees of emphasis. Among these are the personal characteristics of the operator (for instance his proclivity for, or inhibition against, risk-taking) and his sensitivity to relatively small changes in his economic environment (e.g. prices of substitutable inputs or outputs). The farmer's personal goals may have a decided impact on the nature of decision even though this impact may be delivered by sub-conscious rather than conscious thought. This indeterminate influence springs from a generally vague formulation of such personal goals in the mind of the individual. They are shaped more by the heart and soul, and hammered by ambitions, the search for security, and the desire to build.

The budgeter (especially the extension or research worker) would conceivably like to segregate and bring all such factors to bear on their selective decisions, particularly as the point of final choice approaches. Although economics alone does not offer a way of appraising all these goals,

some of them have been studied relative to decision-making. Thair discusses co-existing goals (of income maximization and avoidance of insolvency) for farmers under conditions of uncertainty. 3/ He relates vulnerability factors (those farm characteristics over which a farmer has little control, at least in the short run, and which contribute to the danger of bankruptcy) to security practices. It may occur to the budgeter that some things like financial vulnerability could be measurable and thereby used as criteria for comparing enterprise alternatives with a view to selection among them. 4/

This line of thought leads to the re-appraisal of the budgets in terms of their concurrent operating programs as a basis for making decisions. Column 1 of Table VII demonstrates how requirements for a resource input such as labor, which is necessary to all enterprises, may be measured. A decision may result from this simply by comparing the column with the labor availability (and distribution, if necessary, by breaking down into relevant periods such as the school summer recess). Or it might be decided that the labor input for an enterprise like the turkey proposal is out of proportion to that of other enterprises which make nearly equal returns to net farm income.

3/ Thair, Philip J., Meeting the Impact of Crop-Yield Risks in Great Plains Farming, North Dakota Agr. Expt. Sta. Bul. 392, Fargo, North Dakota, (June, 1954), pp. 9-11.

4/ For a discussion of net income vulnerability for different organizational alternatives see Jensen, C. W., The Economics of Pasture Integration on Irrigated Farms, Montana Agr. Expt. Sta. Mimeo. Circular 67, Bozeman, (July, 1952), pp. 74-78.

Table VII.--Comparison of budgeted alternatives relative to family labor requirements, vulnerability to insolvency, and time flexibility, on a triangle area wheat farm.

Enterprise Alternative	Column 1 Percent Change in Family Labor requirement a/	Column 2 Degree of Vulnerability to Insolvency b/	Column 3 Degree of Time Flexibility c/		
			Crop	Livestock	Combination
Unrestricted wheat (I)	0.0	.66	.500	--	.500
Diverted acres idle (II)	-25.0	.76	.625	--	.625
Barley combination (III)	+ 5.0	.72	.584	--	.584
C.W.G. combination (IV)	-10.0	.68	.375	--	.375
Turkey combination (V)	+40.0	.79	.425	.50	.425
Hog combination (VI)	+10.0	.70	.556	.625	.556
Sheep combination (VII)	+20.0	.74	.265	.50	.265
Cow-calf combination (VIII)	+15.0	.66	.265	.25	.25

a/ Formula: Percent change in family labor requirement = $\left[\frac{(D_{1e} - D_{1w}) + (D_{2e} - D_{2w}) + (D_{3e} - D_{3w}) + (D_{4e} - D_{4w})}{D_{1w} + D_{2w} + D_{3w} + D_{4w}}\right] 100$

where: D = man days of labor; 1, 2, 3, & 4 = consecutive quarters of the year; e = enterprise combination being examined; w = unrestricted wheat enterprise.

b/ Formula: Degree of vulnerability to insolvency = $\frac{E_c + E_p + D}{R_c + L_c}$

where: E = expenses (c = cash farm and p = personal living, which is arbitrarily set at $2,000 for all combinations); D = depreciation; R = receipts (c = cash farm); L = equity in foundation livestock (c = cash or collateral value).

(continued on next page)

(Continued from preceding page)

c/ Formulae: Time flexibility of crop enterprise =

$$1 - \left[P\left(\frac{A_w}{A_t}\right) + P\left(\frac{A_{c1}}{A_t}\right) + P\left(\frac{A_{c2}}{A_t}\right) \ldots\ldots P\left(\frac{A_{cn}}{A_t}\right) \right]$$

Time flexibility of livestock enterprise = $1 - \frac{1}{2}P$.

where: P = period in years that resources are committed to production before cash return is forthcoming; A = acres (w = wheat, t = total crop, and c_1 = crop one, c_2 = crop two, etc.)

Still, the optimistic operator may be a plunger and like to try the turkeys. He may reason that he might save 125 more birds and pare feed costs a little, if the range was good, thus making another four hundred to one thousand dollars!

Conversely, what might be the thinking of a cautious man? In order to stay in business annual farm cash expenses and annual living costs must be met from farm proceeds. To this should be added depreciation. Failure to allow for maintenance of productive equipment may impair the productive ability of the farm. If he has only a small capital equity, one bad year could bankrupt him. In spite of the high net worth indicated by the capital equities of the case farm, the pressure of short run liabilities could force him out of business, even though he were not insolvent in so far as equity is considered. Consequently to gain security, the cautious operator will select the most certain enterprise even though a lower return is forthcoming. The degree of financial vulnerability (relative to solvency) associated with these various enterprise combinations might be gauged (without regard to uncertainty) in the manner demonstrated by the ratios in Column 2 of Table VII. The smaller this ratio the safer might the operator consider his business from unfortunate events. In this case

he might be satisfied to keep range cattle, affording less income but more financial security as well as advantages in hardiness and ease of handling relative to other livestock.

Still another factor may appeal to the operator who is sensitive to relatively small changes in the markets for agricultural products and who has competence in diverse lines of agricultural production. He may be interested in the rapidity with which he can enter and get out of the contemplated enterprise. Assuming that his farm facilities permit this flexibility, he will want to select an enterprise wherein his decision to commit resources to its production may be delayed as long as there remains a choice of alternatives. The ultimate aim will be to select an enterprise which for an equal return ties up resources for the shortest length of time. Column 3 in Table VII indicates the relative performance of the different enterprises in the length of time resources are tied up. The larger the ratio the more flexible is the enterprise or combination. Assuming that the differences in net return are not large enough to alter the decision, the logical choice among crop alternatives would be to grow barley. Among the livestock enterprises, commitments for turkeys and hogs would be least constricting, making these enterprises most attractive.

In the case of complementary enterprises, like crop and livestock combinations, the period resources are committed tocrops in these calculations includes time allowances to permit a crop to be grown, fed, and transformed into a saleable product as livestock marketable at the time planned. Thus grain has to be grown for turkeys and hogs in the year

preceding the feeding period. For sheep and cattle some resources are committed to crested wheat grass for a year and a half before marketable livestock can be produced from it. The critical ratio to be considered is, therefore, the smallest of the crop and livestock ratios. For example, a ewe may be bred in the fall of the year and one year later the lamb will be marketable. But in order to secure crested wheat grass pasture for that lamb the seeding has to be made a year, or under favorable circumstances six months, prior to breeding date.

PART VI

CONCLUSION

Effectiveness of the Budget in Decision-Making

The farmer, extension worker, and research worker undertake budgeting as laid out in the preceding sections because they entertain hypotheses relative to their problem which they hope to pre-test by the budgeting process. An actual test by practice, of any organization selected through budgeting, may never be accomplished since the assumptions employed in developing the budget almost never can be duplicated by experience. Budgeting is an attempt to approximate what experience will bring to pass in order to guide oneself towards events that might be favorable rather than unfavorable. The budgeter's hypotheses take the form of anticipating that some lines of action may be more favorable than others. He wishes to make organizational decisions that will lead to the most satisfactory line of action. The budget is expected to demonstrate the probable result of a family of inter-dependent choices associated with a line of action. Does it do this?

The budget as the tentative consummation of a line of farm planning leads to numerous budgeting selections but these are not active farm planning decisions. Only when the budget is adopted as a guide for a line of action will actual decisions be made. The farm operator will initiate a decisive course of action either if he has confidence in the budget and the figures which enter into it, or when he has no choice but to take some

action. 1/ In the first instance budgeting can be expected to have contributed substantially to the readiness with which he can reach a decision. In the second case some on the spot crude budgeting undoubtedly takes place as a basis for the initial decisions which define the direction of the line of action. In this case the lack of prior budgeting may be expected to make the decisions of the moment less dependable.

Awareness of the probable divergences in efficiency in decision-making has for a long time interested those workers involved in extension. Budgeting has been promoted as a means of stimulating purposeful, systematic, individual action towards desirable ends. The degree to which this goal may be attained depends in part on the reliability of the budget within the context of its highly individualistic environment. This first requires that the framework of the budget be such that all relevant considerations are included and secondly that the data used are accurate forecasts of coming events. The extension worker, in order to demonstrate the effectiveness of budgeting, must need to have his budgeted lines of action perform well in the rough and tumble of actual experience. How well would the plans as laid out by budgets three to eight fare in practice?

The framework of these budgets may be regarded as effective in drawing the attention of the budgeter to relevant details of importance for the study of similar production processes. It calls for inventories of resources in physical terms, delineation of input-output relationships, and

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1/ Johnson, Glenn L., and Haver, Cecil B., op. cit., p. 13.

formulation of expectations as to probable prices to be recieved. In this case it has drawn attention to resources not currently being used. Thus the employment of the pasture land and off-season labor in a productive manner may be considered where otherwise the full potential of these resources might have been overlooked. However this framework is adequate for only those operators well versed in the range of alternatives covered. In other words before a man can use it to test the alternatives before him, he must learn at least the salient operational features of each one, or else the budgets will hide inconsistencies likely to be detrimental to their results. The budget cannot be depended on, for instance, to remind the operator that there may be an expense item connected with docking lambs and shearing sheep, or that in calculating returns on turkeys there is shrinkage to be accounted for. This is where the extension worker must first concentrate his attention in seeing that the budgeting farmer gets adequate information to make all his assumptions explicit.

In budgeting, assumptions may be made that management is typical, but this is hard to match with real life conditions. For even on a farm constituted exactly like the case farm model the framework of the budget excludes an evaluation of personal management factors. No provision is made to expose the individualistic non-monetary objectives of the farmer himself. Although basic to farm management since they affect his economic activities, these objectives may be held in relatively inarticulate form

in the mind of the farmer. 2/ The budgets as drawn up in this study culminate in a distinction between enterprises mainly on the basis of income results. The farmer almost unconsciously may reject those alternatives which, by these criteria, should be the best. Some things in such a budget have made an impression, that he may or may not be able to pin-point, which indicates that the type of operation under consideration does not coincide with his goals. This again is an area in which the extension economist can be particularly helpful to the budgeter on a personal and discreet basis. His job here will be to help the farmer to define his objectives and find the points at which the proposed plans are at variance with them. This may promote the formulation of decisions which otherwise may be blocked by misunderstanding. However the monetary comparison of alternatives should not be abandoned in any event, since this approach serves to demonstrate the possible cost of rejecting a plan which is superior in monetary terms.

In summary, then, it may be said that the farmer, before he starts budgeting, should be willing to expend considerable effort in a study of details relevant to his circumstances. Because of the inherent differences between his farm and other farms in physical features and arrangement, and because he with his family have joint goals which will invariably have at least subtle differences from those around him, the budgeting, to be

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2/ For a discussion of farmers' objectives in farming relative to business survival, see Thair, Philip J., op. cit., pp. 8-10.

satisfactory, needs to be done on an individual farm basis. This is not to say the budgets as laid out herein are useless, for they provide the framework by which such budgeting may be guided. The farmer then, through budgeting, is expected to arrive at a decision-making point which is relevant to his situation. There probably is little doubt that the budgeting brings him into decision-making areas of thought. But whether it is adequate to promote actual willingness to make a choice between alternatives is another matter.

It seems to this writer that the budget needs an additional section, possibly in the form of a balance sheet for non-monetary objectives, which will substitute for the role of the extension economist, as stated above, in probing out the real underlying objectives of the family. Such an addition is needed as a guide for the economist as well as the farmer. The conclusion then is that the budget method may be framed in such a way as to be readily comprehensible for individuals to follow, and that it is a useful planning tool. A further conclusion is that the budget in the form used herein may bring the user into decision-making areas of thought but fails to answer all the questions that assail the budgeter in less than fully articulate form. In other words the budget is by no means a "crystal ball" but rather is a systematic collection of assumptions! For those with foresight in the form of sound economic perception the budget may be a very considerable aid in probing future probabilities. For those with less perfect knowledge, the budget may serve merely to indicate in which direction the most likely possibilities of success might lie.

In any case the budgeter should end up with a clearer notion of the most suitable alternatives available. He has used the budgeting process as an analytical tool to study the strengths and weaknesses of the current farm organization and search out the factors affecting success. Almost concurrently he has used the budget as a synthesizing tool to reconstruct a tentative new organization for farm operation under a managment plan which has been changed in response to a changed environment. He can hardly escape the process without gaining some new or rejuvenated ideas. It may well be that one of the most important features of budgeting is the psychic dividend to be obtained. The lessons of systematization persisting in the mind of the budget user, become a production device indissolubly wrapped up in his planning processes. For the farm user the provisions of the budget existing in his memory become a concrete part of his farm management practices.

Extension Implications

In recent years much has been said about the increasing complexity of farming. Most people are aware of the more conspicuous evidences of this as displayed broadly by mechanization, specialization, and marketing innovations. Few non-agricultural people realize fully the intense organizational activity underlying even the more simple agricultural efforts. More and more, success of the farmer depends on his skill in the management of an involved production and marketing process. All too often urban, and rural people as well, have not recognized the farmer's way of life as a

business. Nevertheless his operation has the characteristics of a business firm and reacts to many economic forces in essentially the same manner.

The farmer himself has been relatively slow in recognizing these economic influences to which he is subject. Changes, to which adjustments must be made, are forced on farmers perhaps more frequently than on entrepreneurs in other kinds of business. Extension workers are becoming more concerned with these circumstances yet they may hesitate to presume on the management prerogatives of the farmer by offering clearly defined detailed management programs. Piece-meal attacks on specific problem areas have been the rule as for example animal health, soil conservation, and promotion of crop and breed improvement. But little, even in the way of business training, and much less the overall farm management approach, has been attempted in management education.

The theoretical economist is able to delineate fairly well the way in which the farm organism and the agricultural industry will react to various economic stimuli. But there is not a great deal he can do to guide the individual farmer in his practical operations. The theorist makes contributions in broader understanding, prediction, and probabilities which are in too nebulous a form for utilization by most men on the land. By contrast the economist as a farm management specialist has more to offer when he can concentrate on an individual farm. He can effectively appraise its resources and for any point in time determine the most efficient combination of the known variables. But there his practical service may end other than in providing the method by which a solution may be found.

Because his solution in one case would rarely apply to another, he can only by demonstration direct farmers in general as to how they may bring about an economical recombination of their resources. Any specific recommendations (except as to method) are little better than the insubstantial predictions upon which he must base his judgement.

Back on the farm the farmer must still be his own economist. Somehow he needs to combine into a usable management procedure what are to him the vague and chimerical outlines of the theorist with the practical balances of the management specialist. Here is fruitful ground for farmers themselves to initiate searching studies into problems particularly relevant to their own operations. But few possess tools other than native ability and know-how with which to attack the problem. Most, however, do put considerable energy and thought into "doping out" courses of action which promise to return to them either satisfaction or profit. Some will get down to brass tacks with pencil and paper while others merely go through a crude mental budgeting process. Beyond changes in equipment and technology their considerations will involve a comparison, of their anticipations relative to markets, yields, weather, and so on, with the results of past experiences. It is an uncertain and often frustrating process, not only because of unsatisfactory predictability, but also because there is seldom an adequate test of the results.

The extension worker is the bridge between the better informed theorists and specialists on the one side and the less well informed farmers on the other. Good communication depends on the capacity of

this bridge. The effectiveness of the bridge, however, depends on the amount of support it gets from either side. Extension services need adequate comprehensible information from the research side for application to the problems at hand. This must be presented by extension personnel in such a way that the farming side will recognize that it applies to their problems. A reverse flow of information is just as important, in that the farmers should bring their problems freely to the extension service whence they are presented to the scientific side in a manner that can result in research directed towards finding solutions. Up till now farm management and economics as such have constituted a rather small part of this exchange system. With economic pressures building up on farms and continuing development of social science research relative thereto, the resultant traffic over the extension bridge is expected to increase.

The budgets and analysis contained in this thesis are intended to fit into this framework. From the research side the work has been aimed at probing into the problem of converting scientific method into action on the farm. The budget method is developed to illustrate how extension personnel and farmers may attack the immediate problem of enterprise selection and combination on an individual farm basis. Because extension staffs cannot expect to collaborate in working out individual solutions for each case, the method also has to be one that is demonstrable on a mass basis. It is thought that the budget method is basically amenable to these purposes, whereas other more exact techniques

which are less easily mastered could not serve these several ends concurrently.

There are further implications for extension channels relative to developing fully the effectiveness of any work done by budgeting as proposed. Besides demonstrating the use of the method to prospective users farm management consultants will have other responsibilities. These include:

1. Moulding the budget framework to be used for attacking any problem so as to best serve the needs of the community in which it is being used by taking cognizance of local features. This involves detailed development of each budget section so as to include pertinent headings, stubs, and spacings.
2. Providing sufficient, suitable, and current non-farm data where it is needed. This might involve compiling community data as well as reference to adequate existing sources.
3. Cultivating a philosophical approach to their problems by the involved co-operators through:
   (a) developing among them ways of appraising their own individual goals objectively.
   (b) instilling the idea that the budgeting or any method of attacking their problems has weaknesses which must be recognized. Thus discouragements may be overcome, and judgement enhanced when the inevitable occurrances of failure supplant rosier expectations.

4. Stimulating farm operators to keep adequate farm records so that they develop a more precise notion of what has happened on their farms. The existence of what amounts to an extended farm history as a source of primary data is of invaluable use in the development of realistic assumptions for budget construction.

In these responsibilities the extension consultant should acquire that degree of tact and flexibility relative to his contacts which will permit him to understand and reflect the value systems used by the farmers he is trying to help. An approach developed along these several lines and applied with finesse may help to advance what is seen as a broad objective for extension in farm management. This may be summed up as constituting an effort to improve the foresight of farmers. Thereby the frequency of their mistakes, so easily seen by hindsight, may be reduced.

Research Implications

The formalized framework of the budget provides an adequate vehicle for the presentation of the strictly monetary results that may be anticipated from a group of alternatives under study. However, at one point or another the budget user may be assailed by doubts as to the reliability of the figures which he finds it necessary to use or estimate in order to complete his budgets. There are as well the aspects of the study problem which the budget by itself does not fully cover.

For instance the budget formally studied excludes rigorous consideration of personal factors associated with farm management. However, the farmer will consider the more obvious non-budget factors by not budgeting

those enterprises that his personal knowledge warns him will be unsatisfactory. For the farmer, the budget in this way is more flexible in regard to personal and physical limitations than it is for non-farm budgeters.

Also only incidentally treated by use of the budget are features of the operating program such as the utilization of labor and the timing of necessary events in the production sequences of combined enterprises. The budget may also be considered as lacking in not drawing specific attention to less well understood phenomena such as vulnerability and flexibility. It is in these areas relative to the budget that research may be productive in illuminating the various adjuncts to budgeting that are necessary to more fully prepare the budgeter for decision-making. Some tentative proposals follow.

Improvement of basic data for budgeting purposes.--For many budgeting operations on the farm the experience of the farmer himself may be the best source of information. But when non-farm data are required his experience may not encompass a wide enough field, nor his records extend far enough, to provide him with adequate information. This is particularly true relative to any market and price information for which assumptions have to be made. Even the extension and research worker will be discouraged by the unsuitability of much of the data available to them. As in the case of the budgets constructed herein, much of the information is non-specific, involving estimations and interpolations. Take for instance the construction of budget V dealing with a turkey enterprise.

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Basic information was contained in Bulletin 248 consisting of forty-two pages. 3/ It required close reading to secure the data pertinent to rations, consumption, and care. But price data relevant to local conditions had to be secured by hearsay. Other marketing information was very scanty. Development of such a budget would have been next to impossible for most farmers. The same is true of the crested wheat grass budget for here again only scattered sources of information were available and data so scanty as to appear controversial. 4/

Research workers are in a position which permits access to nearly all sources of data and they are able to call on specialists to secure the kind of data they require. But the farmer is more limited in his sources of information although he is the only one that has data specifically adapted to his own farm, or knowledge of personal factors pertinent to his management problems.

The whole thought behind this thesis is directed towards involving more farmers in budgeting on their own account. Yet it appears that much essential information is not available in a form that is adequate for their use at the farm level. To minimize these difficulties the thought is advanced that some effort could be put into collecting and arranging

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3/ Cushman, Hariette E., and Welch, Dr. Howard, op. cit.

4/ See Diverted Acres, op. cit., pp. 26-30 and p. 41. Also see Field Crop Varieties in Montana, Mont. Agr. Expt. Sta., Circular 198, (April, 1952), p. 50.

information pertinent to budgeting. This should be helpful to farmers, extension personnel, and research workers alike.

Much published material relating to agriculture, which is of a statistical or scientific nature, appears in a form which farmers generally regard with some suspicion because of its origin and mode of expression. They fail to use it because it lacks instructions on how to adapt the information to their own use in the light of their own objectives. Because it tends to be bulky and is issued piece-meal, subject by subject, and department by department, it is seldom collected or filed in a manner that makes it a complete or easily referred to body of information.

There are handbooks piled on handbooks but another one appears as the most likely aid. The farmer frequently refers to a pocket almanac distributed by insurance or equipment firms. The county agents have their encyclopedic files and loose leaf handbooks. Neither are too suitable for budgeting use, first of all because they are not specific to an area and secondly because they provide no price information. For physical production data there are possibly basic models in the extension publications "Diverted Acres" 5/ and "Guide to Farm Practice in Saskatchewan" 6/ (revised every three years). Some marketing leaflets carry information revealing price trends of products and commodities from week to

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5/ Diverted Acres, op. cit.

6/ Guide to Farm Practice in Saskatchewan, Dept. of Extension, University of Saskatchewan, Saskatoon, Saskatchewan, Canada.

week or month to month. 7/ A few publications attempt to project these trends into the future. Statistical services compile data annually relative to prices, yields, and grades of farm products. 8/ Indexes of prices received and paid by Montana farmers and ranchers provide historical bases of comparison and opportunities for revision on a monthly basis. 9/ 10/

All such information has to be drawn upon when one starts budgeting seriously. It is thought that processing this information and combining it in a handbook designed to present budget information could lead to more effective use of published research and statistical material. After all the aim is to make the farmer more self-sufficient in individual economic analysis. Yet we can hardly expect him to acquire the broad economic training that will permit him to range over all the economic information that is available and select the items that are relevant to his situation. It would seem that there should be some intermediate stage which would sort out and funnel this relevant information to him. Such a handbook is conceived as having the primary purpose of consolidating, into one easily referred to source, the non-farm information that is

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7/ Livestock and Meat Trade Report, Market Information Section, Marketing Service, Canada, Dept. of Agric., Ottawa, Canada, (weekly).

8/ Montana Agricultural Statistics, op. cit.

9/ Taylor, M. C., Indexes of Prices Paid by Montana Farmers and Ranchers 1935-1952, Bulletin 492, Ag. Exp. Sta., Montana State College, Bozeman, (November, 1953).

10/ Taylor, M. C., Prices Recieved by Montana Farmers and Ranchers 1910-1952, Bulletin 503, Ag. Exp. Sta., Montana State College, Bozeman, (November, 1954).

available. The serviceability of such a volume might be increased materially by providing a means of keeping it up to date with periodical releases of new research data. Finally because such a handbook is proposed to be helpful in budgeting it could contain a series of "check-lists" for budgets dealing with various enterprises so that no item that should be considered will be overlooked. This may also include brief references to relevant material for study, or the location of information elsewhere in the handbook. It is thought that many farm operators might find the effort they put into farm planning more productive if they were armed with the information provided in such a handbook and briefed in the use of budgets. The simmering down of the available information, as proposed above, might bring many more farmers into the fold of those who gain immediate benefits from scientific progress in agriculture.

Extending the budget framework to include features of the operating program.--The budget as presented in this thesis leaves out a formal consideration of the operating programs associated with different alternatives. However the budgeter cannot affort to neglect study of the variations in operating requirements. In this vein an attempt to appraise family labor requirements was made. 11/ There is also the consideration of scarce resources such as water for livestock to be balanced between enterprises.

11/ See Part V., Table VII, p. 84. For different treatment of problem see Quenemoen, M. E., Economic Aspects of Water Spreader Developments on Southeastern Montana Ranches, Mont. Agr. Exp. Sta. Mim. Cir. 69, (December, 1952), pp. 41-43.

Perhaps other aspects of the proposed combination of enterprises are competitive as in the case of funds for cash operating expenses. How does a budgeter uncover such features and give them the attention they require?

The suggestion is put forward that a section could be added to the budget with an auxiliary or concurrent relationship which would satisfactorily afford consideration of any features such as these. Some study would be required to formalize the manner in which relative information could be adequately reduced to comparable terms. The important thing would be to get the terms in which comparison was to be made completely comprehensible to the budget user, if these were not of a quantitative nature.

Extending the budget framework to include a consideration of the farmer's preferences.--This perhaps is hardly necessary as an adjunct to budgeting since the farmer concerned may automatically consider his preferences through the strong feeling that is ordinarily associated with likes and dislikes. However some appraisal may be desirable to account for the preferences of other members of the family and to take cognizance of degrees of preference. It is thought that such features could be handled by a section designed to probe, draw out, and balance the farm family's reactions to the proposed alternatives. This perhaps could be handled in a manner similar to the techniques employed by testing and counselling services.

Extending the budget framework to include a consideration of the farmer's objectives.--The suggestion has been made in this thesis that before making final decisions the farmer will at least subconsciously consider other aspects of his environment in making his choice between enterprises.

Such situations as vulnerability and flexibility may be thought over in terms relevant to the farmer's experience. There may be many other equally important circumstances that infringe on this area of consideration. Evidence of this may be found in the articles of research journals which touch on various facets of this area and present hypotheses on why farmers behave as they do and how they respond to certain stimuli.

In this area of thought the budgeter is left entirely to his own devices. Yet such matters may be of paramount importance in arriving at effective determinate decisions, which may be reached at a point far beyond the monetary comparison concluding the budgeting of a group of alternatives. After all how can the layman reduce sensed rather than intuitively known events such as vulnerability, flexibility, risk aversion, or other similar phenomena to understandable terms? 12/ Is he aware of them beyond vague instincts to seek or flout safety in business? Yet different enterprises should require varying degrees of concern relative to these aspects.

The approach to this problem which an extension consultant might take is to lay out the monetary comparisons of the budgeted alternatives but explain what the consequences might be in terms of these other factors. This depends on the consultant's understanding of the implications involved and the farmer's realization of their existence. Surely it would be

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12/ Income vulnerability is discussed in a technical manner hardly suitable to lay use, by Jensen, C. P., op. cit., pp. 76-77.

desirable and helpful if the budget demonstration had some means of uncovering and laying out the objectives of the farmer, and comprehending what circumstances would divert him from his goals. Clearer knowledge and definition of these matters should be helpful to the farmer as well.

Here again it is thought that research could provide an extension to the budget framework which would be helpful in decision-making. First of all a clarification and classification of farmers' objectives in terms which could be measurable and comparable would be necessary. Then some kind of balance sheet along the order of Table VII could be used to bring the relevant considerations together for comparison.

If the results of such study were developed in readily understandable and easily calculated terms the budget would be much more comprehensive in its application. Extension workers and budgeters would be armed with a more useful tool capable of reaching further into decision-making problem areas and stabilizing aspects of consideration of which relatively little is yet known. The outcome of certain lines of action which before might have been in doubt due to obscure personal management quirks might, with such an extension, be quite easily descernible.

Need for more accurate forecasting.--The accuracy of the budget depends on the degree to which assumptions may be made to approximate forthcoming events. If yields and prices could be known beforehand within relatively narrow limits the value of the budget would be enhanced. (Although for comparative purposes a series of budgets may include quite unrealistic assumptions, if all biased the same way, and still provide a sound basis for a valid conclusion).

Decision-making would be made easier if market, price, yield, quality, and all such assumptions could be made with a high degree of certainty that they would closely anticipate future circumstances. To this end continuing research in price forecasting is important to budgeters. Outside the realm of economics and farm management, important contributions to yield forecasts may be made by such innovations as improved long range weather forecasting, developing possibilities in weather modification, or determination of soil moisture reserves by probing or electrical conduction means. In actuality almost any kind of agricultural research implies an improvement in the ability of farmers to divine or control within a narrowing range the outcome of any line of action they choose to follow. The difficulty arises, however, that many findings open up additional alternatives which complicate the organizational job of the farmer. Decision-making thus tends to become more involved when uncertainty increases due to technological change.

New Research Indicated

The work of this thesis serves as a bare introduction to further more intensive study. Suggestions so far made are of a hypothetical and conjectural nature which hardly qualify for consideration as methodological research. Perhaps problems have been indicated towards which further research may be directed. In summary these may be separated into the two areas re-capitulated below:

1. A further development and consolidation of information on the socio-economic behavior of farmers relative to various conditions of their environment. The problem here is that without this knowledge the development of farm management education is hampered. The question may be posed thus:--"Would it be possible to classify the behavior patterns and environmental circumstances of farmers in such a way that some formal consideration could be applied to these factors when dealing with farm management problems which are now approached mainly from the money income standpoint?"

   This examination of the reaction and needs of farmers would seem to be one of the bases upon which extension work in farm management might be built. The question has been asked:--"How do we go about doing this job of extension education in farm management?" This thesis has not attempted to throw much light on this pressing problem for which answers are over-due.

2. The improvement of data available to farmers for budgeting purposes. One of the things needed is a development of techniques which will stimulate farmers to keep more adequate farm business records. On the scientific side the need is for continued improvement in the manner of presentation for the material published for farm consumption. Means of co-ordinating the output of information from different sources could be sought with desirable results.

How may research into these problems be conducted? One thought is that the current farm and home development program of the extension service could provide case studies in both areas of investigation. This would require the observation and recording of the reaction of farmers and their families, in the first case relative to recognizable behavior patterns and environmental conditions, and in the second case to the presentation of educational information in various forms. The study of case data so obtained could point to more effective ways of presenting information for farmer use specifically for budgeting purposes. Further it is anticipated that the socio-economic behavior patterns of farmers might be illuminated in such a way as to advance our understanding of the forces at play in this field. The development of knowledge in these two areas could be applied to an improvement of our extension education techniques.

A second suggestion for a method of research is that a survey technique might be employed. The critical factor here is in the design of a survey schedule which would elicit the desired information. Concerning socio-economic behavior patterns not only would the parameters within which observations are to be made be difficult to estimate but also the personal reactions of the individuals to questions of a private nature and relative to nebulous areas of thought might make it extremely difficult to secure a cooperative response. The thought is advanced that rather than a direct survey in this area of research, certain small items of study could be incorporated into the schedules of numerous field studies over a period of time. The objective would be to build up a fund of information over a

period of time, which, by consolidation according to pre-conceived plan, would constitute a survey of farmer reaction to the characteristics of environments displayed by the sample strata and problems probed in the specific survey of the moment.

Relative to the improvement of data used by farmers in budgeting, direct survey would serve to find out what farmers thought they would like, what they actually used, and the incidence of various kinds of information on farms. Survey also would indicate the reception accorded to disseminations of information presented in conventional and experimental forms.

Whatever method of studying these problems may be employed the degree of success attained will depend on the ingenuity of the researcher. It is hoped that, somewhere within this thesis, ideas are expressed which may subsequently spark such ingenious and worthwhile research.

A P P E N D I X

APPENDIX A

Demonstration of Budget Development

The purpose of these budgets is to provide a means of systematically comparing, on the basis of the assumptions made, the relative returns from a group of production possibilities available to the case farm. In essence it is an attempt to forecast the future consequences of certain actions so that decisions can be made for planning the farm organization and the allocation of farm resources. To do this it is necessary to make explicit the assumptions made and thus expose completely the workings and potentialities of the case farm in order to lay a foundation for the projected changes to be introduced in subsequent budgets. This may be accomplished through an item-by-item examination of the basic farm business structure and a laying out of the parts in their logical order. The tentative reconstructions of the farm business in parallel forms, as represented by other budgets, then display some of the effects of the changes which it is desired to study.

The basic budget, following the organization selected for this thesis, has four main sections which are repeated in all subsequent budgets. However, where a livestock enterprise is introduced it is necessary to consider another array of organizational and input-output relationships. This is done here by the addition of two sections to the original four where livestock is the only product and three sections where there are

secondary products. In order to demonstrate the use of the various sections, Budgets I, II, III and V are developed below as a budgeter might go through them.

Budget I

Land use and crop production section.--This section sets forth the operation of the cropping system generally used in the triangle area. The budgeter should have no difficulty here in setting down an inventory of acreages which will add up to the total for the farm. Half the cropland will be seeded to winter wheat and half will be left for summer fallow. But some wheat may be winter killed so the budgeter will assume that forty acres will be shown (in brackets) as re-planted to spring wheat. This leaves 360 acres unaccounted for and he should classify this according to its use or potential use. He should regard the uncropped land on the rented half section as waste since it is potentially useless to him unless it is fenced and watered or adjacent to potentially usable pasture available to him. On his own land there will be unusable acreage in farmstead, fences, roads, and isolated corners. He will decide that the balance, here set at 325 acres, may be potentially valuable as pasture land. Perhaps at this point, brought face to face with an unused resource, he will speculate on the possibilities of securing some return from it, especially if it occurs to him that his off-season idle periods also represent unused resources.

However, to get along with the budgeting, he must now set down the production of his wheat enterprise. This poses a problem. Because yield

levels are uncertain in the area he may regard the yields of past years as non-typical, or anticipate an abnormality, in the season for which he is budgeting, due to circumstances of which he is already aware. If, as in this budget, he settles on the long term average yield rate so that it will be comparable with the parallel long term average yields of other crops, for which he has no experience to refer to, he may still have to make adjustments. These will allow for differences between his locality and the average, or, as in this budget, be based on seeded acreage of winter wheat rather than harvested acreage. In this case, too, anticipated yield has been advanced by 3 bushels per acre over average yield to compensate for returns to modern technology (particularly weed-spraying) not yet reflected in long term averages. The budgeter will find himself hard pressed to make these decisions without access to a source of outside information, such as reports of neighbor experience and experiment station data. He will find it necessary to take note of any assumptions or guesses he makes in order to construct subsequent budgets with the same bias.

Following estimation of total production, the budgeter will realize that this does not represent the quantity he will be able to market. He must account for other disposition--the reserve necessary for seed, and of course the landlord's crop share. The rest he may expect to eventually sell. But what price can he expect? This with a price supported at a minimum percent of parity is easily determined if consideration is given to relative prices for the location, kind, and quality of wheat to be marketed. But if this budget is regarded as representing a non-compliance

alternative to the acreage restriction problem the returns will have to be calculated differently. 1/ The arrival at a gross return figure completes this section of the budget.

Cash expense section.--The budgeter (especially if he keeps farm records) should have relatively little difficulty with this section. Some of the cash expenses will apply to the farm in a general way such as taxes. Others may be grouped according to resource as for instance fuel and grease. Still others are specific to an enterprise and are conveniently added or subtracted as in the case of hauling charges for cash grains but not for grains used for feed on the farm. However, because costs of production may be highly variable between farms he needs to work them out for his own case on the basis of the rate of use and cost of the various inputs which he can approximate from his own experience. 2/ Relatively small changes in costs of inputs may be anticipated and allowed for, although prices of most items used in wheat production will not ordinarily change greatly from year to year. The greatest difficulty encountered will be in segregating and accounting for all the items that should be considered, such as numerous small repair and supply expenses. The important thing will be to construct the expense sections of all the budgets by following the same basic premises. If this is done the result of one budget relative to

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1/ See Taylor, Maurice C., "Wheat Acreage Allotments - Compliance or Non-Compliance," Montana Farmer-Stockman, March 15, 1955.

2/ See Starch, E. A., Farm Organization as Affected by Mechanization. Mont. Agr. Expt. Sta. Bull. 278, May, 1933, pp. 44-49.

another will remain consistent and no error of judgment in selection should occur. Total cash expenses for this budget were arrived at by using current 1955 cost figures applied to the inputs indicated for winter wheat farms in the 1949 farm survey.

Investments section.--In the previous section the budgeter should have segregated payments of interest from principal payments on land or equipment. At this point he could have speculated on whether the latter payments were a cost for his farm. In all likelihood this thinking would lead him to a consideration of all the money he had poured into land, improvements, and equipment. Such capital items are not a direct cost in themselves although they give rise, in proportion to their rate of annual use, to indirect farm costs such as depletion, depreciation, and interest on investment. Depletion ordinarily is not charged against farm land so need not be considered here. Interest on the investments held in the farm business may be arrived at by considering the opportunity rate of return which is forgone by having those funds tied up in the farm.

To arrive at depreciation the budgeter will need to make a careful inventory and evaluation of the improvements such as buildings and fences (although excluding his personal residence) and calculate a rate of depreciation which would be sufficient to create a reserve adequate to replace them when they deteriorate to the point of uselessness. If he is a thoughtful man, this task will delay him with considerations of original cost, replacement cost, obsolescence (e.g. a horse barn in good condition but unsuitable for current building requirements), and flexibility (usefulness

and therefore value for purposes other than that for which it was constructed). 3/ The same process will be followed in estimating depreciation for his equipment, except that for many items here he will have a better idea of rates of deterioration and obsolescence.

At this point he may wonder if he is justified from a business point of view in owning certain pieces of equipment which exhibit a high annual cost for the services that they give off. Possession of such items represents a form of unused resource for which he may be well advised to develop greater use such as by custom work, expansion of his own operation, or substitution of one piece of equipment where two are maintained now (e.g. noble blade and duck foot cultivator, or disker and tiller, or press drill and conventional drill).

One other consideration may be mentioned at this point. At what level should the value of land and improvements be set? The objective should be a valuation in keeping with a productivity of the land which could return interest and recompense for the risks involved in holding the investment in land. Too low an evaluation may lead to complacency with small returns while too high an evaluation may create dissatisfaction when a low rate of return to investment, labor, and management is indicated. Such situations may lead to unwarranted decisions relative to non-farm opportunities. However, for the purposes of this study of enterprise alternatives within the farm, the budgeter will realize that these considerations are beside the

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3/ For discussion of plant flexibility see E. O. Heady, op. cit., pp. 282-283.

point so long as, for each subsequent budget, items of investment are treated equally.

Financial summary section.--This section serves to bring all the parts of the budget together. From the monetary point of view it is the critical area wherefrom comparisons for decision-making may flow. The budgeter may be impressed by the high level of cash income indicated by his calculations. In fact, those farm operators that do not make a practice of budgeting are frequently misled into an unsuitable line of action by the rosy picture presented by such gross return figures. In this case the transfer of total cash expenses to this section will permit the more conservative net cash income to be examined. More sobering still is the determination of net farm income by subtracting the depreciation, which is calculated in the investment section on total value, not on equity. Net farm income is the important figure, for on the satisfactoriness of this sum depends the welfare of the farmer's family and the attainment of his goals in life. This net farm income, which represents the economic product of the farmer owned resources organized at a level of efficiency in keeping with circumstances prevailing up to the time of acreage allotments, provides the monetary goal of subsequent organizations. Here again the budgeter may pause to speculate that to justify the existence of the farm there should be an adequate net income yield over the long run to provide interest on equity in investment and a labor and management income sufficient to satisfy the needs of the farm family. This net farm income should be comparable with the returns the farmer controlled resources would earn in alternative employment.

Budget II

Budget II demonstrates the position of the operator who complies with the assumed wheat acreage reduction of 25 percent yet makes no attempt to substitute another enterprise to utilize the acreage removed from production. The cropping system (land use and crop production section) is the same as before but land utilization differs in that Budget II shows 200 cropland acres idle. This in practice would be the least productive or most costly land to work. The actual operator of a farm would be able to make some allowance for this situation which would permit more accurate calculations for cash income and cash expense. Consequently this budget, which treats all the land as homogeneous, is unrealistic in that there is no effective way in which the relevant production and cost figures may be adjusted except in direct proportion to the acreage involved. Budget II, on this account, probably shows a greater relative reduction in net farm income than would occur under most actual farm situations.

In dealing with farm operating costs (cash expense section), these cannot all be adjusted according to the amount of cropland actually seeded. For the reasons stated above, some expenses may be less than in proportion to the acreage used. Taxes will remain the same as in Budget I, and insurance or interest would only be changed in special cases where the amounts involved relate to cropping operations (e.g. hail insurance) and not to the farm buildings and equipment. Even supplies and miscellaneous expenses (electricity, paint, etc.) could decline less than proportionally to the acreage reduction. The fixed costs, represented by depreciation of

buildings and fences, (investments section) remain the same, as does the depreciation of equipment, for all practical purposes, since obsolescence and exposure contribute a relatively large proportion of decreased value, by comparison with deterioration through use. Consequently the percentage decrease in income (financial summary section) through acreage control is greater than the actual percentage of acreage reduction.

Budget III

Land use and crop production section.--The land use system allows for 400 acres of crop and 400 acres of summerfallow as in the basic organization. However, the substitution of 100 acres of barley for the displaced wheat involves a whole new set of management decisions. This acreage would have lain over winter unprotected by the customary winter wheat crop. It may have been subjected to varying degrees of wind and water erosion and undoubtedly will have a crusted surface. Early scarification is necessary to cut down moisture loss and create a cloddy surface.

The planting of a cover crop in the preceding summer might have been a profitable practice conservation-wise, especially if the cover crop could have been used or sold for grazing. 4/ However a cover crop would reduce the moisture reserves available for the spring crop, which would be critical

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4/ Wheat farmers in sections of southern Alberta have made a practice of seeding protective cereal grains on summerfallow in late July or early August. The sale of grazing rights on these fields to cattle feeders in the fall has been reported as more than compensating for the cost of seeding plus any loss of yield on the subsequent spring crop.

in the case of barley. The choice between this pair of alternatives will depend on the relative gain possible from the cover crop in contrast to the probable loss of return from the subsequent barley crop, as well as on the value ascribed to the conservation practice. The farmer must keep in mind that barley is shallow rooted and does better with a deep seed bed in a finer state of tilth than necessary for wheat. The earliest possible seeding, providing that frost is not a hazard, will generally be most productive. The farmer must prepare for this spring task which is additional to his customary spring work.

The variety he chooses to grow will affect his later activities. However, among numerous varieties only Compana is recommended. It is an early, drought resistant, two row, non-shattering variety which may be straight combined, while other kinds require more careful harvesting. Special attention must be given to securing seed free from loose smut and stripe mosaic. Although barley competes with early weeds, spraying will generally be profitable. Here again, more attention must be given to barley than to wheat since barley is more susceptible to damage, especially since farmers are less aware of the sensitive stages of development for this crop.

Barley, however, may permit a better distribution of labor. First, it may relieve the pressure of seeding fall wheat about harvest time. Secondly, the use of an early variety may allow the barley to precede winter wheat in the harvesting sequence. Provision will need to be made for additional grain storage facilities due to the bulky nature of barley

and its higher bushel yield relative to wheat. From season to season, the out-turn from barley is less dependable and more variable than wheat, therefore extending the extremes of uncertainty in the farm business, not by any means reducing the variance. Market-wise, the price of barley is supported in the same manner as wheat. Hence, no problem exists in determining what minimum price may be anticipated for a given grade at any selected location.

Cash expense, investments, and financial summary sections.--The cash expense section covers about the same size of operation for the wheat-barley organization as for wheat alone so that little significant change is anticipated in costs except for hauling the grain. It is also assumed that the investment inventory covers adequate storage capacity to look after the budgeted increase of about one thousand bushels in total grains. The financial summary is completed as before.

Budget V

Land use and crop production section.--Again the land use system provides for half crop and half summerfallow with the maximum acreage allowable in wheat. The diverted acreage is divided between barley, oats, and some crop which can substitute for wheat or corn in the turkey diet. 5/

5/ Actually, wheat would make the most satisfactory and relatively the the largest constituent of a normal turkey ration. However, the regulations regarding acreage allotment would require any wheat produced for feed to come from acreage within the control limitation. With an assured support price for the cash wheat crop it is assumed that the farmer would be reluctant to use wheat for feed in view of its more uncertain return through the livestock.

(Continued on next page.)

This division is made on a basis which should produce these grains in proportions most nearly approximating the desired overall grain ration for the growing turkeys. Selections have to be made between varieties which will provide a suitable sequence of seeding and harvesting operations, as well as suitability for handling with the equipment on the farm. Perhaps the use of hulless oats and barley varieties would permit a higher proportion of these grains to be fed to the turkeys. Some changes may be introduced depending on the relative productivities of the different grains in pounds or T.D.N.'s per acre. Rye is unpalatable to turkeys, hence unsuitable as a wheat substitute, but hog millet and dwarf varieties of grain sorghum may serve, although not enough is known about yields and feeding characteristics locally. Some thought should be given, when introducing new varieties or kinds of grain, to the protection of Montana's high quality wheat from contamination with volunteer grains. As with the barley alternative, particular attention must be given to weed spray application if it is used, since oats are sensitive at stages when wheat and barley are safe from damage.

(Continued from preceding page)

5/ Because of its superiority as turkey feed it might appear to be productive to use some wheat in the turkey ration rather than selling it. However, a question then arises concerning the use of the diverted acreage which already, for the size of project considered, will produce the maximum of coarse grains which can be used in the feed ration. To consider the use of wheat then would make an increase in the size of the turkey feeding project necessary, in order to use the diverted acreage for feed production. A turkey farm rather than a grain farm would result.

Consideration of the land use system must also allow for turkey range. Initially, as in this budget, the unused pasture may be utilized if it is accessible. If turkeys are to be produced in succeeding years, a longer-run program should be initiated. Turkeys should not be returned to the same land oftener than once in three years due to danger of disease losses, as well as the fact that nutritional deficiences seem to show up very quickly on continuously used range. In one year 2000 turkeys can use 20 acres of good pasture, but for dry unimproved range this figure will be much larger. Adequate good range may save up to 20 percent of the grain (calculated at 10 percent for this budget). Consequently, it may pay each year to switch 20 acres of the diverted acreage into alfalfa if a productive and convenient piece of ground is available. This, however, would involve isolation or fencing problems. Probably more satisfactory would be utilization of a cover crop seeded on summerfallow earmarked for spring seeding. With 400 acres in summerfallow, an isolated area could be selected to avoid the necessity of fencing. Neither of these alternatives is allowed for in Budget V.

Cash expense section.--Farm costs are adjusted to conform to the changed crop system. Fuel, oil, and repairs are increased to take care of additional field operations, tractor use in moving turkey equipment, and grinding grain for mash. Also, considerable daily use of truck and car would be necessary in feeding and watering the birds, thus increasing operating costs. Grain hauling, for wheat only, is the same as in Budget II. Seed treatment and spray material are adjusted to fit the needs of the

substitute feed crops. Supplies and miscellaneous expenses would increase materially with additional electricity for brooding and pumping water, sacks, veterinary expenses, and sanitation requirements. Four months additional hired labor is also added to provide for a turkey herder. Insurance and taxes remain the same as in preceding budgets. But the interest item will increase, first bacause of long term interest on addition to investment (only 5/6 of which is paid for) and secondly, because it is expected that interest will need to be paid on short term borrowings to meet some of the cash costs of poults, feed, labor, repairs, or fuel, oil, and grease.

A large amount of direct livestock expenses is associated with the turkey project. The cost of the poults is a major item which may be reduced if poults could be secured at less than the maximum price allowed for here. The thrift of the turkeys will depend to a large extent on supplements which will need to be purchased at relatively high costs through the normal channels. It would be possible to pare feed costs by careful ration reconstruction with the cheapest protein ingredients available. In this budget expensive fish oil was partly replaced by cheaper soy bean (expeller) meal. Availability of a source of skim milk or buttermilk would reduce the cost of protein supplements.

Investments section.--This section allows for the additional investment necessary to accommodate the turkey enterprise. Buildings of a minimum nature for summer brooding of the poults, as well as the fencing and equipment for the feeding, watering, and handling of the growing turkeys is estimated at a material cost of $2730. It is assumed that the farmer

could accomplish the necessary construction by using the off-season or slack season labor already on the farm. Because success has been achieved with turkeys sleeping on the ground with less stampeding danger than when roosts are built, investment in this is not accounted for. Nor is equipment for herder living, protection from predators or storm, considered in this budget. It may well be that the farm has unused buildings or material that can be converted to brooder housing thus saving a portion of the above investment. Also, new construction of grain or implement storage may be so designed as to provide facilities for dual use during the brooding season. Brooder housing may serve as fall shelter, particularly if built with portability in mind. In this budget as well, an allowance under machinery is made for the addition of a feed grinder and feed mixer.

Livestock organization section.--The budgeter's hypothesis about the turkey alternative will be conditioned by the desire to utilize as feed all the product of diverted acreage. An Extension release reveals that 2000 birds handled somewhat like a band of sheep will constitute a one man unit. 6/ Consequently, this seems to be a reasonable number to budget for in view of the fact that one half or one quarter of this number would not utilize all the feed yet would demand a large part of one man's time.

The livestock system set forth in this budget first involves consideration of breed, once a decision to raise turkeys has been made. Also,

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6/ Diverted Acres, Extension Publication Ag-36, (Revised), Extension Service, Montana State College, Bozeman, Montana, (September, 1935) p. 35.

an order for poults must be placed with a hatchery as early as January 1st in order to get the delivery time and the kind desired. For this operation Broad Breasted Bronze have been selected due to their large size, rapid and efficient growth characteristics, and relative hardihood for the open range. Beltsville Whites may be less desirable for the extensive operation planned in this budget, although they should market at a higher price. Both these and White Hollands are less prone to fighting, but their white color may make them more vulnerable to predators. Because turkeys are vulnerable to many hazards, certain losses must be anticipated in spite of care which is assumed to involve continuous supervision of the flock. Extreme watchfulness is necessary to ward off troubles within the flock as well as from outside sources. Crippled and injured birds should be slaughtered and salvaged to prevent cannibalism. Diseased birds must be detected early, the cause determined, affected birds destroyed, and stringent corrective measures applied. Losses as low as 5 percent are not impossible. For large supervised flocks, they should not exceed 10 percent, although this budget allows for about 12 percent loss.

Organization of this turkey feeding project requires careful integration with the seasonal operations of the farm. In this budget it is planned that the poults will arrive after the spring seeding is accomplished, probably between May 15th and June 1st. It is assumed that the farmer himself, with family help, could care for the poults in the critical starting period of 8 to 12 weeks fitted between spring work and harvest time. The regular hired man can keep up with the field work at this time.

Children coming out of school about June 1st would be available to participate in the project. Once the turkeys go out on range the labor load will increase and with harvest approaching the farmer could revert to supervision, hiring an additional man to herd the turkeys for the remaining growth and fattening period. This additional hired labor accounts for the sharp increase shown in farm labor cost. The alternative possibility, that already started poults (ready to go on the range) could be secured, is remote. However, such an alternative would make it unnecessary to invest in brooding equipment and housing. Prohibitive added costs of the poults and disease considerations may make the scheme untenable although a case of this practice has been recorded in Montana, while development of "pig hatcheries" is a precedent.

In any case the growing turkeys on range should be brought along with three marketing periods in mind. The earliest is Thanksgiving, followed by Christmas and then the Winter Pool of frozen turkeys. The producer may aim at any one of these markets but a distribution between them will afford an opportunity to dispose of the birds as they reach prime condition. Since the flock will not all develop at the same rate, this practice will result in a higher percentage of top quality product. This is particularly important if the producer plans on marketing other than live birds. However, facilities for on the farm processing are not likely to be available to the producer, and, without freezing equipment, processing such a large number would not be practical on the farm.

The producer in the "triangle" area would need to make arrangements for marketing well in advance since processing capacity in Great Falls and other Montana points is limited in capacity. Consequently, selling the birds alive, in conformity with current practice, is likely to prove most satisfactory. Modern trucks can reach distant markets without difficulty with a live load and bids can be secured from various purchasers. Thus, the farmer may be able to wind up his feeding project within seven months of receiving his poults. For those who plan to leave their farms during the winter this is an advantage over other kinds of livestock.

Livestock feed requirements section.--Some consideration has to be given to this section before the land use and crop production or the livestock organization sections can be completed. The production of feed on one side needs to be balanced by the consumption on the other. 7/ Serious study has to be given to the constitution 8/ of suitable rations 9/ from the feed resources purchaseable or available on the farm. The quantity and value of these purchased feeds has to be calculated before the cash expense section can be completed. Purchased mixed feed is allowed for the first ten weeks at least, as being the safest means of securing

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7/ Cushman, Hariette E. and Welch, Dr. Howard, op. cit., p. 25.

8/ Cushman, Hariette E. and Welch, Dr. Howard, op. cit., p. 11.

9/ Halbrook, E. R., Beeckler, A. F., and Smith, E. P., op. cit.

an ideal starting ration. For the growing and fattening period the home grown grains are used, with about half as whole grain, and half ground and mixed with the purchased concentrates shown, which are adequate to maintain the nutritional requirements of the turkeys on range. If mortality due to fighting and cannibalism is to be held to a minimum, care should be taken to maintain the level of nutritional supplements represented by these concentrates.

Livestock products section.--This section records the output and return anticipated for the turkey enterprise. Turkeys customarily have been sold on a "New York dressed" basis. Hens command a higher price than toms, but average several pounds lighter when marketed at six to seven months of age. The out-turn is estimated at average weights but a shrink of seven percent is estimated because it is anticipated the turkeys will be moved a long distance for slaughter. Price per pound is slightly lower than that prevailing in 1954 due to a less favorable prospect in 1955. However, it is expected that the prices will maintain their relationship with the prices of other meats so that a drastic price change is not likely.

Financial summary section.--This part can be completed when all other sections are worked out. The significant change is the very much larger cash income which indicates the substantial increase in the size of the farm business. This is achieved through increasing and intensifying the use of labor, management, and short term credit or cash reserves, without a great increase in fixed investment.

The first question may be whether the net farm income is increased enough to offset the increased effort and the financial hazards involved. Uncertainties are faced at every turn such as the availability and skill of labor, prices of feeds and the product, the thrift and weight gain of the turkeys, and, above all, the mortality of turkeys due to weather events, care, and disease. One effect is probably an increase in the variability of net farm income through the adding of uncertainties which are not negatively correlated.

Considering the budget developed here, the addition of a cent or two to the estimated price or a pound or two to the average weight, is quite within the bounds of possibility. Both would substantially increase income. But like losses could occur. Similar changes would result from saving or losing an additional fifty turkeys, or experiencing more or less shrink. In spite of this variability the increased size of business and a larger turnover would likely result in a higher average net farm income over the long run, given adequate management.

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