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FARM LOAN REPAYMENT POLICY NEEDS IN RIO GRANDE DO SUL, BRAZIL -- A FRAMEWORK FOR INVESTIGATION

By

Bernard L. Erven

CONTENTS

INTRODUCTION

The intent of this paper is to formulate a meaningful conceptual framework for the inquiry into farm loan repayment policy needs in Rio Grande do Sul, Brazil. This framework for investigation includes a brief discussion of the nature and setting of the problem, some provisional objectives and a possible procedure for investigation all in Part One.

Part Two of the paper constitutes a background study for the type of investigation discussed in Part One. An understanding of capital, farm credit and potential loan repayment policies seems essential if a meaningful approach is to be taken to the problem of loan repayment policy needs in a specific area. It is the intent of Part Two of this paper to develop such an understanding.

The author's interest in farm loan repayment policy needs as a meaningful and researchable problem in Rio Grande do Sul, Brazil, stems primarily from discussions with Professor Glen Pulver. Professor Pulver was associated for approximately 18 months with the University of Rio Grande do Sul, Porto Alegre, Brazil as a researcher and professor of agricultural economics. Professor Pulver's suggestions concerning farm loan repayment policies as an area of research were substantiated by research recently completed by Norman Rask which dealt in part with the capital accumulation and organization of a selected group of Rio Grande do Sul farms.[1/]

[1/] Norman Rask, Farm Size and Income: An Economic Study of Small Farm Agriculture in Southern Brazil, Unpublished Ph.D. Thesis, University of Wisconsin, Madison, 1964.

CHAPTER I

FARM LOAN REPAYMENT POLICY NEEDS IN RIO GRANDE DO SUL, BRAZIL -- A FRAMEWORK FOR INVESTIGATION

Background

Farmers of Rio Grande do Sul, the southern-most state in Brazil, are faced with a problem of acquiring the use of a group of capital resources which complements their labor, management and equity capital. These farmers may be divided into three groups on the basis of the nature of their capital situation. The first group includes farm operators in the early stages of becoming established who may have little if any capital accumulated. For example, with an agrarian reform program which includes land distribution, the new land owners may not only be faced with a need to borrow 100 per cent of the purchase price of the land but also to borrow for the purchase of machinery, equipment and supplies to operate the farm. Even if an agrarian reform program includes preferential treatment of beginning farmers through grants, reduced purchase price or other subsidies in the form of technical advice, for example, this group of farmers has unique capital acquisition problems.

A second group of farmers can be characterized as having an established or "going" operation. But these farmers need to expand the volume of their operations to maintain or improve their level of living. Purchase of additional land is one of the basic ways of increasing the volume of the business. The capital acquisition problem of this group is one of using the existing resource situation as a basis of business expansion.

A third group of farmers may be portrayed as having an adequate resource base in terms of fixed inputs but be lacking in variable inputs. This group of farmers is faced with a fundamental problem of insufficient volume just as the second group described above but the nature of the scarce resources is different. The additional inputs may, in a short period of time, bring about returns amounting to several times the added capital investment. But if the additional funds for investment are not available, the income opportunity must be foregone.

Each of these groups of Rio Grande do Sul farmers is experiencing rapid and dramatic changes in agricultural technology. Evidence of these changes exists in many parts of the area. Relatively large, mechanized family farms with utilization of up-to-date fertilizers and insecticides are not uncommon in some localities. Where size of farm and topography prohibit mechanization, changes in technology are occuring, for example, in the form of better crop varieties, fertilizers and better livestock breeding. These changes in technology tend to complicate rather than alleviate the problem of resource acquisition.

The problem

With changing technology and increasing capital requirements, a basic question arises concerning means by which these capital needs can be met. When the need for capital exceeds the equity supply, farmers may use non-equity capital to complement their equity capital. Various alternatives may be available to farmers for complementing their equity capital, for example, borrowing money, joint ownership of machinery and co-operative purchase of supplies.

Historically, borrowing money has been an important means of complementing equity capital. It remains as a major means by which Rio Grande do Sul farmers may increase their capital supply.

When farmers borrow money, time and form of repayment are variables which may be adjusted to fit the circumstances of the borrowers and lenders. Whether or not a farmer borrows money and the consequences if he should borrow are greatly influenced by the repayment policies of the credit institution. If Brazilian farmers are to make effective use of credit in meeting rapidly increasing capital requirements, the repayment policies must be compatible with their repayment capacities. To meet this requirement, the repayment policies need to allow the farmers to have sufficient increases in their disposable income to motivate the borrowing and at the same time be able to repay the loan and interest due within a period of time which is in keeping with the income flow of the farm businesses.

A basic research question is suggested by the above discussion: what farm loan repayment policies specifically fit the needs (or repayment capacities) of selected groups of Rio Grande do Sul farmers?

This basic research question in turn suggests an inquiry into (a) the productivity capacities of selected Brazilian farms with the use of additional capital and (b) the flow of income resulting from the use of additional capital. This specific description of the existing productivity and capital flow situation should provide a basis of evaluating various existing or proposed farm loan repayment policies.

Procedure

A suggested procedure for investigating the type of problem outlined above follows.

(1) Review the available literature which is relevant to the problem under consideration. The available literature should be examined with three central points in mind: (a) the existing theory and techniques of loan repayment policies, (b) the methodology used by other researchers in dealing with similar problems and (c) conclusions concerning debt repayment policies reached by other researchers.

(2) Describe and analyze various debt repayment policies that are potentially applicable to the Rio Grande do Sul situation. This process of description and analysis entails clarification of terminology used in farm credit discussions as well as the development of working concepts of various debt repayment policies.

(3) Select the specific groups of Rio Grande do Sul farmers for study. Considerable detailed and descriptive data concerning farm organization, financial structure, use of credit and farm income has already been collected. Additionally, relatively accurate census data is available. Consultation with economic researchers and others familiar with the Rio Grande do Sul situation should facilitate the selection of specific groups of farmers for study.

(4) Gather additional data needed for analysis of productivity, income flow and debt repayment capacities.

(5) From the assembled data, synthesize detailed farm situations representative of the groups of farmers being studied.

(6) Analyse the representative farm situations to determine debt repayment capacities.

(7) Determine what loan repayment policies are being used in Rio Grande do Sul or are adaptable to the area.

(8) Evaluate the existing or adaptable loan repayment policies in terms of the repayment capacities of the selected groups of farmers.

(9) Explore possibilities for modifications to existing loan repayment policies or propose new policies that are compatible with the repayment capacities of the selected groups of farmers.

CHAPTER II

CAPITAL AS A FACTOR OF PRODUCTION

The farmer may be a minifundista of Rio Grande do Sul, Brazil, with less than three hectares, a Midwest grain farmer with a $150,000 investment, a nomad of the Middle East who is faced with an incessant search for "new pastures," a Nigerian who functions as a part of a large tribal agricultural operation or a shepard of Australia with a ranch of thousands of acres but for each capital and credit are crucial factors in the process of agricultural production. Each of these farmers has one basic problem in common -- the acquisition of or right to use sufficient resources which will allow him to have an acceptable standard of living. In each case, farm credit may be an essential means for approaching the problem in a realistic manner.

Capital as a factor of production

Adam Smith defined capital as that part of a person's stock from which he intends to derive his income. Smith identified four types of "fixed" or productive capital; (1) capital invested in machinery which facilitates and/or curtails the use of labor; (2) capital invested in profitable buildings such as shops and warehouses; (3) money required for improving land, clearing and draining, for example, is used for productive purposes and thus qualifies as capital, according to Smith; (4) capital used to improve the "dexterity of a workman may be considered in the same light" as machinery which facilitates and reduces the labor required. This type of capital investment is quite similar to the contemporary concept of "investment in human capital."[2/]

Marshall's definition of capital took Smith's definition as a starting point, "only wording it a little differently, and saying, 'a person's capital is that portion of his wealth by which he wins his livelihood.'"[3/]

2/ Wealth of Nations, Book II, Chapter I.

3/ Marshall, Principles, Chapter IV.

Marshall concluded that two basic concepts were involved in capital. Capital has a productive capacity first of all. The productive aspects of capital give rise to returns that may be consumed immediately or at some future date. Such deferment of consumption leads to Marshall's second concept of capital -- "perspectiveness." Clearly the two concepts are quite similar but the second concept introduces savings. Capital then is said to result from saving which involves "a sacrifice of present enjoyments for the sake of the future."

A strict definition of capital which precludes any source other than savings is not in keeping with the concept of capital now widely held by economists as well as non-economists. Capital in its pure economic sense does not include the free "gifts of nature" not made by man. To exclude the "gifts of nature," a capital good may be thought of as any material economic good other than land which is used for the production of wealth. A more general definition and one that will be used in the succeeding discussion is that capital encompasses all resources except labor and management used for the production of goods and services.

The problem of capital supply for farmers entails assembling the material goods such as land, buildings, machinery and equipment needed for production. These material goods are of three general types and three corresponding types of capital are required: (1) real estate capital, (2) equipping capital and (3) operating capital.

Investment in land and permanent improvements to the land constitute real estate capital. With extensive agriculture, real estate capital usually represents the largest portion of the total capital investment. With operations that are very intensive in terms of labor, buildings or mechanization, real estate capital is usually relatively less important. Permanent improvements increase the basic productive capacity of land over an extended period of time. Such improvements include land clearing, drainage, terracing, irrigation ditches, fences and buildings intended for more than a very few production cycles.

Equipping capital is characterized by investments that are not of a permanent nature such as land, but extend over more than one production cycle. Machinery, equipment, temporary storage facilities, temporary

housing facilities for livestock and livestock kept on the farm for breeding purposes represent this type of capital.

Operating capital is used to cover the variable costs encountered within a production cycle. Operating capital is generally "consumed" within a production cycle and does not carry over into a succeeding production cycle. Examples of purchases made with operating capital are seed, feed, fertilizer, feeder cattle, broiler chicks, hired labor, marketing services and miscellaneous supplies. Increased investment in the form of operating capital is a means of increasing the returns to the farm business relatively quicker than additional investments made in equipping or real estate capital. For example, increased returns from the use of improved seed or use of additional fertilizer will be available at the end of one production cycle. Added returns from improved buildings or machinery on the other hand, are spread over more than one production cycle.

As pointed out above, the problem of capital supply for the farm business is one of assembling the material goods needed for production. There is nothing in the production function that says that ownership of the material goods directly influences physical output. Control or use of material goods is the critical aspect of the problem of capital supply. The right to use a resource can be transferred and it is this attribute of productive resources that makes it possible for credit (transfer of the right to use a capital resource) to potentially play an important role in farm finance and in a broader view, farm management.

CHAPTER III

FARM CREDIT

Farm Credit Defined

As a transfer of power

Credit may be said to be simply the transfer of power to use a capital asset from one person to another. In this sense, a careful distinction is made between use of a capital asset and ownership of a capital asset. Gaining control of capital through credit is quite similar as a concept to gaining control of a specific resource by renting. Renting generally involves acquiring the power or right to use a capital asset embodied in a particular type of resource such as land while credit involves gaining the use of a more versatile capital asset -- money. In both renting and credit, a transfer is made of the right to use as distinguished from ownership rights. In essence the farmer that borrows is increasing his economic power to undertake a particular course of action in farm production.

As a mutual agreement between a borrower and lender

Since credit involves a transfer from a "have" to a "have-not," it is a joint venture. The transfer does not take place unless both parties explicitly agree to the provisions of the loan. Security requirements, interest (cost of the right to use) and time and form of repayment are negotiable aspects of the agreement between the two parties involved.

The agreement is no better than the confidence the two parties have in each other. In fact, the word credit comes from the Latin word "credo" which means "I believe." To borrow money, a farmer needs to exhibit evidence of continued solvency and positive prospects of being able to repay the loan according to the agreed-upon terms. Furthermore, in most cases the farmer must have adequate security to pledge as a guarantee that he will be able to fulfill his obligations to the credit source.

As a flow of capital or as a means of redistributing capital

Credit, as an institution in any economy, exists dependent on a two-fold situation. One aspect of the situation is the existence of a group of people that have accumulated sufficient wealth that they are willing to temporarily transfer the power to use a part of this wealth to other people. The willingness to make the temporary transfer is dependent on the assurance that the power of use will be returned at some future date plus a payment for the returns foregone and risk encountered in making the transfer. The amount of such payment for use, or in other words, the interest rate, is a function of the risk of non-payment encountered by the lender and the alternative uses for the loaned funds available to the lender. As a holder of wealth makes additional investments, his returns from the marginal investments will generally decrease. When the expected marginal return from an additional investment is less than the return from loaning the capital to another person, the wealth holder will maximize his returns by loaning.

The second aspect of credit as a flow of capital is that the marginal returns to the borrower from using the capital must be greater than the marginal cost of borrowing. The marginal cost of using borrowed funds includes the additional risk and uncertainty involved in borrowing and increasing the size of the farm business. A transfer of capital can be profitable to both the borrower and lender if they are at different points on their investment functions. The lender will have reduced his marginal returns by continuing to exploit investment alternatives. But unlike the lender, the borrower will not have taken advantage of some of the relatively high return investment possibilities open to him. By his borrowing money to do this, both he and lender benefit.

The inducement for capital to flow from individual to individual or group to group comes primarily from an expectation of added profits to both parties of the agreement. There can be other inducements, however, for capital to flow through the institution of credit. Governmental agencies may also influence the flow of capital through credit by loaning government revenue resulting from taxation or other revenue sources. In essence, capital may flow from the relatively wealthy

to the non-wealthy or from the "haves" to the "have-nots" without the profit motivation being a key factor. In fact, having to pay taxes to the government may reduce the amount of funds invested by a firm and thus reduce its profits. From the standpoint of the governmental agency such a transfer of capital may be a means of increasing the income of "capital-hungry" farm firms in the economy.

Types of Farm Credit

The literature contains several classifications of farm credit. Some of the classifications are relatively standard and denote specific concepts while others are still largely subject to interpretation and further development.

Influence classification

Murray has developed a three-way classification of credit based on the credit's influence on the farm business. His three types of credit are: (1) positive or productive, (2) neutral or maintenance and (3) negative or unproductive. Positive or productive credit "enables the farmer to produce a net surplus above the cost of production; the credit must produce enough to pay the principal of the loan, the interest and provide a surplus besides for the farmer."4/ The distinctive quality of positive or productive credit is that it improves in real terms the position of the farmer and his family relative to what it would have been without the use of credit.

Neutral or maintenance credit enables the borrower to stay in business but there is no surplus from the use of credit. Principal and interest payments annually take all or nearly all the added returns. However, this

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4/ William G. Murray, "Principles and Practices Used in Making Farm Production Loans," Proceedings of the International Conference on Agricultural and Cooperative Credit, Berkeley, California, 1952, p. 387.

type of credit may be essential to keep farmers in business in the event of disaster, low prices or other unexpected situations that reduce farm income to a critically low level temporarily. Neutral credit serves to perpetuate the status quo and thus inhibits adjustments in farm businesses that would otherwise occur. The advisability of such inhibition of adjustment is a complex issue with ramifications that go far beyond farm credit.

Negative or unproductive credit results in farmers having to use income other than that generated by the credit to cover repayment of principal and interest. In essence, a farmer is worse off for having used negative or unproductive credit. A farmer does not borrow if he knows that he is going to be worse off as a result. But loans intended to be productive or positive can turn out to be unproductive because of crop failures or disasters, for example. However, in some cases a loan is unproductive or negative because the farmer and the lender have simply misjudged the outcome of the loan because of an inability to effectively evaluate the farmer's situation. Lenders who look for and find the factors which cause loans to be unproductive will not often make loans that disadvantage the farmer, the lender and society.

Belshaw has classified credit according to two categories: (1) static credit and (2) dynamic credit. He characterizes static credit as leaving the farmer, after payment of interest and principal, with an asset situation and a capacity to produce no different than when he undertook the use of credit. Static credit helps the farmer maintain his position but does not lead to an improvement of it.5/ Murray's concept of neutral or maintenance credit and Belshaw's static credit are not significantly different.

Belshaw defines dynamic credit as leading to a cumulative increase in output. This is the same concept that Murray has for productive or positive credit.

5/ Horace Belshaw, Agricultural Credit in Economically Underdeveloped Countries, FAO Agricultural Series No. 46, Rome, 1959.

Although Belshaw has no term corresponding directly to Murray's negative credit he is of the opinion that "very often the purposes for which credit is used, the manner in which it is applied, and the conditions under which it is given, lead to a deterioration" in the farmer's position.6/

Agency classification

Butz has distinguished "sound credit" from "soft credit" primarily on the basis of the objectives of the lending agency. He suggests that the term sound credit be reserved "for the loaning of money where the interest rate and other charges were sufficient to cover all costs, including a calculated risk of loss."7/

"Soft credit" characterizes loans which are not designed to be self-supporting, even if the borrower should meet all his contractual obligations. Governmental agencies established to provide farmers with funds through grants or partial grants should not be criticized by applying the standards of "sound credit" agencies. A partial grant of a "soft credit" agency is quite different from a "loan gone bad" for a "sound credit" agency.

Balanced credit

In the above discussion of different types of farm credit, it is generally assumed that a farmer will have specific needs for capital and will need the capital for a specific period of time. In recent years there has been increased attention given to treating the farm business as a single operating unit having a credit need. This is contrasted to a farmer's piecemeal credit program under which he borrows from uncoordinated sources for uncoordinated purposes. This concept of coordinated complete financing through one agency with the total farm operation and its capital needs as paramount has been called several

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6/ Ibid., p. 46.

7/ Earl L. Butz, "Postwar Agricultural Credit Problems and Suggested Adjustments," Journal of Farm Economics, XXVII, May, 1945, p. 283.

different things. The terms "package credit," a "balanced credit program," "comprehensive credit service" and "farm management loans" are included in discussions concerning farm credit. These terms can be taken to be quite similar in connotation although specifically they have been used to mean different things to different people.

If farm credit is viewed as a short-run or temporary but necessary evil and a debt-free farm business is the farmer's goal, then the piecemeal approach to farm finance will be firmly embedded. But if credit is assumed to be a continuing requirement if the farmer is to maximize his returns, a "balanced credit" approach appears to best serve the purpose. The existence of credit as a continuing, as contrasted to a temporary, requirement is not limited to farmers of one type, of one age or just farmers of underdeveloped or relatively more developed countries.

There are several basic advantages to a balanced credit program or package credit. First, with only one credit agency to deal with the farmer can borrow in terms of his total operation. This means that the security he has to pledge and the productivity of additional capital will allow one lender to establish the total amount of credit that he may borrow. The farmer can have one pledge of security to cover his entire operation and all subsequent loans are covered by this one pledge. This should materially reduce the cost of any new loans through elimination of a new appraisal, title search and new loan fees.

Second, the arbitrary rule that the productive life of the machine, animal, etc. determines the maximum length of the loan need not be used. This is an arbitrary determination in that the length of productive life may or may not coincide with the opportune time for repayment. With conventional security requirements, the length of loan can not exceed the productive life of the item but with a pledge of security based on the entire operation, this would not be necessary or even desirable. As long as the net worth of the farmer is increasing at a rate sufficient to cover the security requirements of all the outstanding debt, the lender is in a sound position.

Third, a lender is in a better position to counsel a farmer on the use of credit if he is aware of the total farm business situation. Credit decisions are

made best in terms of the entire operation and not just for one segment or for the production of one commodity.

Farm Credit--A Panacea?

Much has been said to point out the importance of capital as a factor of production. Farm credit is a recognized means of complementing the equity supply of capital. But the hazards of using credit also need to be recognized. T.N. Carver has emphatically pointed out that credit is not a panacea in the following words:

> There is no magic about credit. It is a powerful agency for good in the hands of those who know how to use it. So is a buzz saw. They are about equally dangerous in the hands of those who do not understand them.8/

Although Carver was reflecting on the United States, similar observations have been made relative to other countries. In India, it has been observed that "cheap and easy credit has often enough been the ruin of the thriftless individual farmer, who has used this doublt-edged sword (credit) to his own undoing."2/ An extreme view is expressed in an old French proverb which says "credit supports the farmer as the hangman's rope supports the hanged."

If low farm incomes were merely a result of inadequate farm credit, the low-income farm problem probably would be much easier solved than is the case in reality. Several background conditions needed to make farm credit an instrument of real progress can be identified. The following conditions are not necessarily ordered according to importance, nor is the assumption made that the absence of one or more is necessarily justification for not extending loans to farmers. Some of the con-

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8/ Quoted in: William G. Murray and Aaron G. Nelson, Agricultural Finance, Fourth Edition, The Iowa State University Press, Ames, Iowa, 1961.

2/ Edward Nevin, Capital Funds in Underdeveloped Countries, MacMillan and Co., Ltd., London, 1961, p. 83.

ditions are:

1. A recognition by both lenders and borrowers of the importance of business character as a basis for credit. Such recognition is evidenced by a legal basis for using credit, the prompt payment of interest and installments and ample notice of any delays in such payments by the borrowers.

2. A system of land tenure which provides for stability of occupancy and a fair division of return that enables farm operators to benefit directly from improvements made in their farming operations.

3. A set of farm credit agencies which facilitates the flow of capital into agriculture and between its parts and minimizes the risks involved.

4. A marketing system which facilitates trade and permits desirable specialization. Such a system is characterized by suitable storage facilities, regulation of the issuance of warehouse receipts as bases for credit, standard grades along with a related inspection system, market news services and an improved transportation system.

5. An educational system which aims first at the development of technically trained people who go into the fields to instruct farmers in new methods; second, at the elimination of illiteracy by widespread elementary education; and third, education to provide skills in trades and professions.

6. Governmental services to aid in the control of plant and animal pests and diseases.

7. Conditions favorable to good health such as village sanitation, safe water supply, medical and clinical services.10/

In short, credit is not a panacea or a cure-all for the farmer with an "unacceptable" farm income, much less for all economic and political ills. Recognition of this is essential if farm credit is to be put into proper perspective when analyzing farm firm finance management problems.

10/International Conference on Agricultural and Cooperative Credit, Farm Credit in Underdeveloped Areas, Berkeley, 1952, p. 121.

CHAPTER IV

PRINCIPLES OF FARM LOAN REPAYMENT TERMS

One of the most important matters in the use of credit is the emergence of debt repayment terms that relate debt repayment capacity to increased output. Loan repayment terms are easily given a minimum amount of attention. Attention seems most often devoted to simply getting the money into the hands of farmers. Thus repayment terms are often not planned in terms of the specific characteristics of the farm business but instead on what seems to be conventional.

Principles of sound repayment terms

"Ideal" loan repayment terms maximize the credit utility for the borrowers and provide good prospects of recovery for the lender. Repayment terms directly influence the amount of debt that a farmer can safely carry. But also, the specific characteristics of a farm business influence directly the repayment terms which are most desirable for it. There are certain principles which serve as broad guide lines in determining debt repayment terms for specific situations.

Once the specific characteristics of a farm business are known and an understanding exists of how loan repayment terms can be varied to meet the needs of a farmer, it is possible to determine specific loan repayment terms that are in line with the needs of the farm operator.

Capital available to farmers and capital actually used by farmers are quite different. In some cases, it is not possible for farmers to borrow under any terms. This is a true case of capital not being available to farmers. In other cases, farmers can borrow money but they do not for one of several possible reasons.

There may be a reluctance to borrow just because being in debt is an evil to be avoided if at all possible. In such a case, a farmer will borrow when absolutely necessary and repay the loan as soon as pos-

sible. Modifying the repayment terms will do little, at least in the short run, to change his attitude towards farm credit.

There is another group of farmers that is not presently borrowing but would be willing to do so if the repayment terms were adapted to the specific characteristics of their farm businesses. The debt repayment terms influence not only the likelihood of a farmer using credit but the expense of his using credit. Interest and loan fees are directly influenced by loan repayment terms. Investment opportunities foregone may represent a higher "cost" to the farm business as a result of repayment terms which are not compatible with his operation. For example, if a farmer has a sound investment opportunity that will not have a return for five years and the only money he can borrow must be paid back in less than five years, the investment and thus an income opportunity must be foregone.

Loan repayment terms not only influence the profitability of a farmer's using credit but more basically they influence his attitude toward credit and the likelihood that he will use credit as a means of maximizing his returns.

The major variables in debt repayment terms are: (1) length of the repayment period, (2) dates of principal and interest payments, (3) flexibility of payment schedule, (4) interest rate, (5) service charges, (6) form of principal and interest payment, (7) security offered as pledge of repayment and (8) extent of amortization. A discussion of each of these variables follows.

Length of the repayment period

In the case of short-term loans the repayment period is one year by definition. The principal is ordinarily repaid in a lump sum at the end of the year. The interest may be deducted at the time the loan is made or at the time of the principal payment.

Critical aspects of the loan repayment period become apparent when consideration is given to loans extending beyond one year or one production cycle. The question arises as to how long the repayment period should be extended.

The loan repayment period directly affects the amount of debt which a farmer can safely carry. If the repayment schedule is too rapid, the farmer will not be able to make the payments without serious curtailment of his level of living or ability to take advantage of additional investment opportunities.

Principal and interest payments are given less priority than some other financial obligations of the farm family. Family living expenses have the highest priority. Living expenses can be reduced to facilitate the payment of debt and accumulation of capital provided the farm family is not at a subsistance level of living. Production bills, taxes, interest, insurance, maintenance and repair costs must also be paid from the gross farm income. After all these other expenses are met the amount left for debt retirement may be limited.

However, the problems in determination of the loan repayment period length are not confined to avoidance of too short a period. As the repayment period is extended, an increase occurs in the probability of significant price changes, inclement weather, major changes in technology, decline in health of the farm operator and changes in other factors which affect the ability to repay. Consequently, a greater margin of safety is needed as the repayment period is extended. Part of the potential increase in the safe debt load resulting from extending the repayment period is lost due to the need for an increased margin of safety.

A logical question follows concerning the maximum length of the repayment period. A possible working principle for determining the maximum length of the repayment period is that the period of loan should not exceed the life of the improvement, equipment, or the livestock purchased.[11] It is argued that if the repayment period is extended beyond the life of the improvement, the farmer is paying for something which he is no longer

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[11] See Bernard O. Binns, Agricultural Credit for Small Farmers, FAO Development Paper No. 16, Rome, 1952, p. 16 and James L. Robinson, Credit in Use and Conservation of Agricultural Resources, USDA Agricultural Information Bulletin No. 122, Washington D.C., 1957, p. 8.

receiving. It is proported that this is an unjustified cost to be borne by current income. From the lenders' standpoint, settling for a "dead horse" is an undesirable situation.

If this principle is used in determining the length of the repayment period, the lender is not financing the farm as a unit but is financing on an enterprise or individual loan basis. If the farm business is financed as a unit with an open-end mortgage or with some other guarantee of repayment, the length of life of an improvement becomes an unrealistic means of determining the maximum repayment period. If a farmer is making progress in capital accumulation and improving his level of living, it may be to his advantage to limit debt repayment to make further capital investments. This approach to increasing capital investments and improving the level of living is not compatible with the proposed principle.

As indicated above, extending the repayment period reduces the annual principal payment. Such an extension also increases the total interest payments over the life of the loan. As illustrated in Table 1, increasing the period of a $1000 loan from 5 to 10 years results in a marked decrease in annual principal and interest payments. As the repayment period is lengthened the advantage of any further extension is decreased. It is apparent that a repayment period can be extended to such a degree that a farmer makes very little progress in debt reduction. Such a situation is not serious if the long-run prospects for returns on the borrowed funds exceed the cost of using the funds.

TABLE 1: Full Amortization of a $1000 Loan, at 4% Interest, for Selected Repayment Periods.

Repayment Period In Years	Annual Payment[1]	Reduction in Annual Payment	Total Principal Payment[2]	Total Interest Payment
5	$225	----	$1000	$ 125
10	123	$102	1000	230
15	90	33	1000	350
20	74	16	1000	480
25	64	10	1000	600
30	58	6	1000	740
35	54	4	1000	890
40	51	3	1000	1040
50	47	4	1000	1350
100	41	6	1000	3100

[1]Includes principal and interest

[2]Total over the life of the loan

Dates of principal and interest payments

The sale of farm produce is not generally distributed evenly throughout the year. The income pattern varies with the nature of the farming operation. A producer that has as a major source of income only one crop that is marketed at one time during the year is faced with the problem of adjusting his bill payments accordingly. A dairy farmer on the other hand with no other major source of income will have an income pattern that presents considerably less difficulty in arranging bill payments.

The due dates for principal and interest payments should coincide with the time or times that the farmer normally receives payment for his products. If possible, due dates should not fall within periods of heavy production expenses.

Flexibility of payment schedules

There are three basic aspects of flexible repayment schedules: (1) deferment of principal payments to service "problem" loans, (2) adjustment of payments to selected variables such as prices of farm products, crop yields, farm income, etc., and (3) provision of option to make advanced payment.

No matter how carefully the repayment period and maturity dates are planned, there will be justifiable reasons in some cases for later modifications. The flexibility in this case is actually postponement of payment due to unforseen circumstances. Crop failure, for example, may leave a farmer with no alternative to postponement other than surrender of part of his equity capital. This alternative may well spell ruin for the farmer. If postponement is made, it is usually best to recalculate the future payments so as to spread the effect of the postponement over as many years as possible.

Variable payment loans embody a particular type of flexibility. Such loans are designed to have principal and interest payments which fluctuate with one or more selected variables that directly and immediately affect the repayment capacity of the farmer. This concept of adjusting repayment to the farmer's needs is theoretically sound. However, its major and significant practical limitation is the difficulty of establishing an acceptable variable that realistically represents a basis for the adjustment of payments.

Murray has suggested four possible variables to which payments might be adjusted: (1) prices of farm products, (2) crop yields, (3) rental shares and (4) farm income.[12/] The major difficulty with using the prices of farm products is that when yields are below normal, prices are above normal. Consequently, when

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12/ Murray and Nelson, op. cit., p. 184.

prices are higher, the farmer is expected to make an above normal principal and interest payment but this is the very time when he is not in a position to do so because of the low yields.

The "crop yields plan" is somewhat better than the "prices of products plan" because higher payments are expected with above normal yields. But this plan does not work well if the higher yields are off-set by low prices. The "rental share plan" is suggested to overcome some of the objections of the first two plans. With this plan, the lender receives a proportion of the farmer's physical output. The lender applies the proceeds of this output to the interest and principal due.

The "farm income plan" is also theoretically sound in that payments are adjusted to the farmer's net income. Practical limitations arise however, in computing net farm income, determining reasonable living expenses and allowing for variations in the quality of management.

Provision of an option to make advanced payment is an additional form of flexibility. If such an option exists, a farmer can pay off his loan at a faster rate than originally planned. An unexpected increase in repayment capacity might result from increased yields or prices or technological changes that increased the efficiency of production. Such an option may also allow a farmer to refinance if interest rates decreased after his loan was made. The option payment privilege is less desirable for the lender than the farmer. Consequently, lenders may insist on certain restrictions to protect themselves even if they are willing to allow the option.

Interest rate

To the farm operator, interest is an operating cost associated with using non-equity capital just as rent is an operating cost associated with using someone else's land or equipment. The important consideration is the relationship between the cost of using the non-equity capital and the increased returns that may result from such use. Interest rates which are too high can be an impediment to the development of a farm business. But interest rates need to be high enough to induce the lender to temporarily part with some of his funds.

The interest rate is a percentage of the principal to be paid, for each unit of time. The unit of time, unless specified otherwise, is one year. However, the quoted or nominal interest rate is not always a satisfactory basis for analysis of credit costs. Analysis is best made on the basis of the actual or true interest rate.

There are three common procedures for determining the total interest charge:

(1) annual interest on the unpaid balance
(2) annual interest on the original or face amount
(3) interest paid in advance -- a discounted loan[13]

The differences in these procedures can be illustrated with a hypothetical loan of $120 for one year with a nominal interest rate of 5%. If the loan was repaid at the end of one year in a lump sum the interest charge would be $6. In this case the nominal and actual rates of interest are identical. If the loan was repaid in 12 equal monthly installments of $10 with interest computed on the unpaid balance, the interest charges would decrease monthly as shown in Table 2.

With a payment plan calling for equal and evenly spaced payments, the actual or true annual rate of interest may be computed by using the following formula:[14]

$$\frac{\text{Total of finance charges}}{\text{1/2 original loan}} \times \frac{\text{Number of payments}}{\text{No. of Years}} \times \frac{1}{\text{No. of payments} + 1} = \text{Actual annual rate of interest}$$

Substituting into the formula from Table 2:

$$\frac{3.26}{60} \times \frac{12}{1} \times \frac{1}{13} = 5\%$$

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[13] Aaron G. Nelson, Credit as a Tool for the Agricultural Producer, North Central Regional Extension Publication No. 4, University of Nebraska, Feb., 1957, p. 14.

[14] Ibid., p. 15.

TABLE 2: Example of Interest Computed on the Unpaid Balance. Principal, $120, Interest Rate 5%, 1 Year Monthly Payments of $10.

Number of Installment	Total Installment	Interest	Principal Payment	Unpaid Balance
1	$10.50	$0.50	$10	$110
2	10.46	.46	10	100
3	10.42	.42	10	90
4	10.38	.38	10	80
5	10.33	.33	10	70
6	10.29	.29	10	60
7	10.25	.25	10	50
8	10.21	.21	10	40
9	10.17	.17	10	30
10	10.13	.13	10	20
11	10.08	.08	10	10
12	10.04	.04	10	0
Total	$123.26	$3.26	$120	-

With 12 equal annual payments and the interest figured on the unpaid balance, the nominal and actual rates of interest are identical. From this it is apparent that making monthly payments does not alter the fact that the real and nominal rates are identical when interest is figured on the unpaid balance.

With the same loan as used in the above example but interest computed on the original or face amount, $0.50 in interest would be paid each month. The total interest charge for the 12 months would be $6.00 ($0.50 x 12 months). Substituting into the above formula:

$$\frac{6.00}{60} \times \frac{12}{1} \times \frac{1}{13} = 9.23\%$$

In this case, the real or actual rate of interest is nearly double the nominal rate.

When a loan is discounted, it is most common to deduct the interest from the principal. Thus the borrower does not have the use of the face value of the loan. With the above loan as an example, $6.00 ($120 x 5%) would be deducted from the principal. If the loan was repaid in a lump sum the actual rate of interest would be:

$$\frac{6}{114} = 5.3\%$$

If 12 monthly payments of $10 each were made, the interest charge would be $6.00 as above. Substituting in the formula:

$$\frac{6}{57} \times \frac{12}{1} \times \frac{1}{13} = 9.72\%$$

The variation in actual interest rates with the procedure used in computation is illustrated in Table 3.

TABLE 3: Variation in Actual Interest Rate with Selected Computation Procedures and Payment Plans. Principal, $120, Nominal Interest Rate 5%, 1 Year Term.

Interest Paid On:	Payments	Actual Interest Rate
Unpaid balance	Lump sum	5 %
Unpaid balance	12 monthly	5 %
Original amount	12 monthly	9.23%
Original amount in advance	Lump sum	5.3 %
Original amount in advance	12 monthly	9.72%

Service charges

In addition to interest charges, borrowers may also have to pay some service charges. Some examples of service charges are carrying charges, "time differential" payments, credit or finance charges, application fees, inspection fees and loan closing fees.

Regardless of the nature of the service charges, they represent an additional cost of borrowing. If service charges are involved in a loan, they must be included in the total cost of borrowing to compute a meaningful actual or true interest rate.

Form of principal and interest payment

Farm loans are ordinarily repaid with money received for the sale of farm products. The "rental share plan" discussed above represents an alternative form of repayment. Instead of selling the total production, receiving cash and then giving a part of this to the lender, the farmer may simply give the lender a share of his output. If the lender is a marketing agent for the farmer, this form of payment is quite efficient. It is advantageous to the farmer because it is compatible with variations in yields and prices. Furthermore, it is advantageous to the lender because he has a first claim on farm income.

Security

A credit institution encounters risk when it loans funds. A nearly riskless operation can be conducted by loaning only to large farmers who have substantial assets and earning power. A credit institution can conduct a very risky operation by granting too many loans to farmers who have little if any repayment capacity, tangible assets, prospects for increased productivity or intangible assets such as moral character. The security which a credit institution requires is one way it has to economically protect itself against the risks which it is bearing in lending money. From the standpoint of the lender, the critical aspect of the security it requires is not the form of the security per se but whether or not the pledged security adequately covers the risk which is encountered in making the loan.

The nature of the assets which a farmer can pledge as security vary considerably. Land is a common security for farm loans. It is tangible and has a continuing value in farm production. But to some extent these very characteristics are limitations of land as security. Farm credit institutions which depend on land as security will sooner or later be faced with the problems involved in foreclosing on land. Land values fluctuate over time and in a period of widespread default on farm loans, the land prices may be relatively low. The credit institution is then faced with the choice of becoming the owner of large areas of land or selling the land at low prices. A credit institution is not equipped to operate farms. The land forced to be sold may be purchased by a very few people which leads to land aggregation and an increase in tenancy. Belshaw has reported this situation in India and Burma.[15] Assessing the value of land as security can present complications. Not only does the price of land fluctuate but the quality varies considerably.

The social implications of owning land must also be considered. The importance which a farmer attaches to owning land may make him very reluctant to pledge it as security. Land to a farmer may represent his only hope for the future. To risk losing this hope may be out of the question.

A farmer must have clear title to any asset which he pledges. W. Don Michael, in a study of Ceylon, is quoted by Belshaw as follows: "Credit transactions over land, therefore, involve long and tedious delays in investigation and clarification of title, and not infrequently have to be abandoned in the end."[16]

However, the most serious limitation of land as security is that often the farmers most in need of additional funds simply do not have land to pledge. Use of other immoveable assets such as farm buildings present difficulties similar to land when used as security.

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[15] Belshaw, op. cit., p. 31.

[16] Ibid.

Livestock, machinery, stored produce, standing crops and other production materials may also be used as security. All of these are subject to relatively short productive lives and thus have decreasing value over time as security. Problems of accurate determination of value, positive identification and perishability are encountered with this type of security.

Personal security as a pledge is a way of overcoming at least some of the limitations of tangible assets as security. When personal security is used, the primary criterion in making a loan is repayment capacity. Repayment capacity is measured in terms of ability to maintain assets and output, meet loan charges and repay the principal without reducing the level of living of the farm operator and his family.17/

For a farmer with limited tangible assets, family labor is the most abundant asset. Using repayment capacity as a basis for loaning allows a farmer to use his most abundant resource, labor, to secure funds.

Tangible assets still have a role when farm credit is based on repayment capacity. Their primary value is that the pledging of property and the public humiliation of subsequent foreclosure exercise a restraining influence on the actions of the borrower.18/ This, to the lender, is of more value than the possibility of recovering the loan through taking possession of the pledged, tangible assets.

Collective personal security may also be used to secure a loan. Belshaw and Binns have identified three approaches to collective security:

1. by using others to act as sureties for loans,
2. by the issue of a joint bond by a group of borrowers under which each borrower receives a separate loan for the repayment of which members of the group are jointly and severally responsible,
3. by collective liability through co-operative credit societies.19/

17/ Belshaw, op. cit., p. 32.

18/ Binns, op. cit., p. 18.

19/ Belshaw, op. cit., p. 109 and Binns, op. cit., p. 18.

In the case of cooperative credit societies liability may be unlimited or limited to a multiple of the capital share which each member is required to hold.

Extent of amortization

There are three basic methods of distributing payment of principal and interest over the period of the loan: (1) lump sum payment, (2) partial payment or partial amortization and (3) complete amortization. Lump sum payment is commonly used for short-term loans. Partial and complete amortization are commonly used for intermediate and long-term loans. Amortization will be defined more precisely and discussed in detail in the following chapter.

CHAPTER V

PLANS OF AMORTIZATION

Amortization is a means of systematically spreading the payment of principal and interest over the life of the loan. This procedure is an alternative to a straight end or lump sum payment which entails payment of the entire loan on the expiration of the term. The straight end payment can be used on a loan of any term but is generally used for short-term and intermediate loans. Amortization is adaptable to intermediate and long-term loans.

A modification of the lump sum payment plan is partial payment. With a partial payment plan, periodic interest and principal payments are made but there is still a lump sum (somewhat less than the original principal) due at the end of the repayment period. A loan of this type, for example, would be a $200 loan for a 10 year term with interest at 5 per cent on the outstanding balance, and with principal payments of $9 per year. As is shown in Table 4, at the end of the first year the borrower would pay $10 interest and $9 principal or $19. The second year the principal payment would still be $9 but the interest payment would decrease by $.45 because of a decrease in the unpaid balance of $9. The interest payment would continue to decrease by $.45 each year until the loan was paid. The principal payments would be $9 each year until the tenth year, the year in which the loan comes due. The final principal payment would be $119 or the amount of unpaid principal after 9 annual payments of $9 each. This type of repayment is sometimes called a "balloon" plan because of the last principal payment being the largest.

There are numerous varieties of this partial payment or "balloon" plan. If the terminal principal payment is equal to each of the annual payments, the plan is no longer a partial payment plan but a more extensive application of it commonly called an amortization plan.

TABLE 4: Example of Partial Payment Loan With Terminal Balloon Payment. Principal, $200, Interest Rate, 5%, 10 Years, Annual Principal Payment, $9 plus Balloon Payment.

Number of Installment	Total Installment	Interest	Principal Payment	Unpaid Balance
1	$19.00	$10.00	$9	$191
2	18.55	9.55	9	182
3	18.10	9.10	9	173
4	17.65	8.65	9	164
5	17.20	8.20	9	155
6	16.75	7.75	9	146
7	16.30	7.30	9	137
8	15.85	6.85	9	128
9	15.40	6.40	9	119
10	124.75	5.95	119	0
Total	$279.75	$79.75	$200	-

Amortization loans

Amortization means paying a loan by a number of installments. Each installment includes an interest and principal payment. The percentages of the installments for interest and principal depends on the specific terms of the loan. The size of installments, proportion for interest, proportion for principal payment and frequency of installments are the major variables to be agreed upon by lender and borrower when an amortization plan is used.

Installments are commonly paid annually, semi-annually, quarterly or monthly. Any period can be used, as an amortization plan functions the same regardless of the length of time between installments. The above discussion concerning length of the repayment period, due

dates and flexibility are directly applicable in determining the time period for installments.

The size of the installments depends upon the plan of amortization or repayment used, the number of years required to repay the loan, the interest rate, and the amount of the loan. There are many amortization plans that may be used. Most, however, are modifications of two basic plans: (1) even payment plan and (2) decreasing payment plan.

With the even payment plan, installments are equal. Part of each installment is for interest and the remainder is applied on the principal. The amount of interest payment gradually decreases as the principal decreases. A high percentage of the early payments is for interest while towards the end of the loan, interest charges decrease and practically the entire payment is applied to the principal. The even payment plan of amortization is illustrated in Table 5.

TABLE 5. Example of Loan Amortization Table - Even Payment Plan. Principal $200, Interest Rate 5%, 10 Years, Annual Installments

Number of Installment	Total Installment	Interest	Principal Payment	Unpaid Balance
1	$25.90	$10.00	$15.90	$184.10
2	25.90	9.21	16.69	167.41
3	25.90	8.37	17.53	149.88
4	25.90	7.49	18.41	131.47
5	25.90	6.57	19.33	112.14
6	25.90	5.61	20.29	91.85
7	25.90	4.59	21.31	70.54
8	25.90	3.53	22.37	48.17
9	25.90	2.41	23.49	24.68
10	25.90	1.22	24.68	0
Total	$259.00	$59.00	$200.00	-

The annual payments are $25.90 on a $200 loan with 5% interest. The loan is completely paid at the end of 10 years. On the first payment, $10.00 is for interest ($200 x 5%) and the remainder of the $25.90 payment ($15.90) is for principal. But as the proportion of the total fixed installment for interest decreases, the principal payment increases. Only $1.22 of the final payment of $25.90 is used for interest and the remainder or $24.68 reduces the unpaid balance to zero.

With the decreasing payment plan the installments decrease throughout the loan period. The principal payment is fixed and the interest decreases with each installment because of a decreasing unpaid balance. A decreasing payment plan is the same as the partial payment plan illustrated in Table 4 except that the principal payments are equal for all installments instead of all but the last installment. A decreasing payment plan is illustrated in Table 6.

TABLE 6: Example of Loan Amortization Table - Decreasing Payment Plan. Principal $200, Interest Rate 5%, 10 Years, Annual Installments.

Number of Installment	Total Installment	Interest	Principal Payment	Unpaid Balance
1	$30	$10	$20	$180
2	29	9	20	160
3	28	8	20	140
4	27	7	20	120
5	26	6	20	100
6	25	5	20	80
7	24	4	20	60
8	23	3	20	40
9	22	2	20	20
10	21	1	20	0
Total	$255	$55	$200	-

CHAPTER VI

EPILOGUE

The intent of this paper is to discuss the role of capital as a factor of production in agriculture, the nature of credit as a facilitating agent in this process of production and the relevance of farm loan repayment terms to a farm credit program.

Established credit institutions have generally evolved through the demand and supply of capital funds. They have acquired their current characteristics after a period of development and experiment. Farm loan repayment terms which are mutually acceptable to lender and borrower are an essential part of "desirable" credit institutions. A "desirable" institution is here taken to be one which facilitates the credit needs of the group of farmers for which it is intended.

A critical evaluation of private money lenders should serve well to summarize and to emphasize the importance of farm loan repayment terms. Private money lenders play a very important role in farm finance in many countries. Yet, they are often criticized for their exploitive practices. For example, quoting the Indian Agricultural Finance Subcommittee, the All-India Rural Credit Survey states:

> The money lender is certainly no philanthropist. His object is to make money, and he is not always particular regarding the means by which he does it. He will debit his client with all incidental expenses. He will cause an illiterate borrower to put his thumb impression on a blank form, and subsequently fill it up with a sum in excess of the amount actually lent. He charges a rate of interest that is always high and often extortionate and compounds it at frequent intervals.[20]

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[20] All-India Rural Credit Survey Volume II -- The General Report. Bombay, 1954, pp. 174-175.

Incorporated in this statement is seemingly just cause for assuming that private money lenders in India are insignificant sources of farm finance. But the contrary is quite true -- they are a major source of farm finance.

Two logical questions follow. First, why are the private money lenders such important sources of funds? Second, how can they exploit borrowers in this manner and still continue to operate profitably year after year? The answer to these questions lies in the continuation of the above quote:

> Nevertheless, when occasion arises the money lender can and does show leniency. He will not for instance, use his fraudulent bond unless the client by his contumacy forces him to go to law. Again, if his debtor is prompt and punctual in repayment, he will allow him rebate of interest when the account is finally closed. Meantime, it is to him that the needy peasants turn for help in every trouble. He does not keep the borrower waiting for his money till the time for its profitable spending has passed. He does not press for repayment at due date if he knows such repayment is inconvenient. He does not conduct embarassing inquiries into his client's financial condition; for what it is worth, he knows it already and the element in it to which he attaches most importance is the client's reputation for prompt and regular payment.

The key point is that the money lender's chief attribute is his ability to serve the borrowers' financial needs. The loans are made in terms of the specific characteristics of the borrowers. If farm credit is to be a positive factor in improving the status of farmers, some of the positive attributes of the private money lenders may well serve as guides in designing repayment policies that help in persuading farmers that it is to their distinct advantage to borrow.

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