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Creating a New Methodology for Granting Rural Loans

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1. CHAPTER ONE: Introduction

Brazil is quickly becoming one of the major world players in the agribusiness sector. It is the third largest in the supplier segment, with tendencies towards enlargement, considering the positive conditions of fertile lands, big volume of raw materials, and the tropical climate. The rural segment, including all agribusiness, is one of the largest job generators and has an important share in the total income of the country.

Considering that Brazilian competitiveness is progressing and that many variables affect competitiveness, one can expect improvements in the next few years and, consequently, a larger market-share in world grain markets. Nevertheless, as we know, in order to improve crops, to improve yields, and to achieve lower production costs, capital investments are necessary. Capital is required to purchase equipment; for research and development of new technologies; and for working capital.

Recent research from Fundação Getúlio Vargas found that the major problem rural producers' have is a lack of access to credit. For Brazilian producers this means that their lack of capital acts as a huge barrier to market growth. A large part of this problem is the high risk of lending to farmers. Inside this context it is necessary to find new ways to attract investors, and new mechanisms to reduce risk, so that commercial banks and private multinational corporations can carry funding, at reasonable interest rates, allowing for profits to the sector. The purpose of this paper is to show the evolution of Brazilian agriculture and to recommend new mechanisms to allow institutions to analyze and manage the risk of farmer borrowers, including stress testing in agricultural loans.

Thus, the scope of this manuscript is not a discussion of how to create public policies for lending to poor, beginning or small producers. Competitive markets, macroeconomic stability, and public investment in the physical and social infrastructure are widely recognized as important requirements for sustained economic growth and consequently, can help to reduce rural poverty. The strategy to reduce rural poverty, according to Khan, would be to gather information about the particular problems they face so that they could be adequately addressed; to focus on building assets like

agricultural land or other resources; and to provide access to credit or improvements in health and educations.

However, informal and formal sources of credit are often too costly for, or are unavailable to, the rural poor and the small producers. Lessons from the past reveal that the most benefited by Brazil's targeted public sector rural credit programs are the medium and larger producers. Their debts have been rescheduled and, at times, even forgiven. Thus, these programs, especially if they are subsidized, benefit the non-poor far more than they do the poor.

The poor and small producers want and need credit that is available on acceptable terms and when they need it. For them, the government must develop special programs, which have to be approved by the congress, and be previously put in the government's budget. Recent experience with PRONAF and PROGER[1] have been successful in reaching target groups at a reasonable cost.

Another issue to be considered is the FTAA Free Trade Agreement of Americas. Its implementation in the next few years will deeply change the way that countries in the Americas will trade agricultural products. With fewer barriers to trade, it will be very important to have comparative advantages to compete in the market, to increase exports and the GDP. For Brazil, investments into new technology; into increasing productivity; and into improving infrastructure will bring good conditions for competitiveness.

[1] PRONAF /PROGER are programs that have been designated to small family production and to growth familiar income, witch conditions of lending have been adapted to the reality of the small rural producers. The Federal Government pay the difference between the price charged by the CODEFAT, the administrator of the fund, plus the bank's spread and what is paid by the rural producers.

2. CHAPTER TWO: Recent Evolution on Brazilian Agriculture

Brazil has harvested it's largest crops of grains in recent years, achieving more than 100 million tons of crop. With the introduction of the Real Economic Stabilization Plan, in 1994, Brazil dropped its inflation rate from 40% per month to about 5% a year. International market players, particularly those competing directly with Brazil, have blamed the devaluation of the Real for the increased volume of production and exports from Brazil.

On the one hand it's true that the devaluation has helped the competitiveness of Brazil's agriculture, as well as the abundance of land and labor. On the other hand, the major cause of the country's improved performance has been the simplification of several complex market processes. Some of these structural changes are:

a) The increased stability of the Brazil's economy has brought a decrease in the real value of land; a restructuring of Credit System; and an increase in domestic aggregate demand and a renewed capacity to do Medium-Term Planning;

b) Enhancements in transport logistics: many government initiatives and private firms were put in place in the last years to reduce transportation costs of agricultural goods from producing regions and consumption regions. Among then:

I – New Port Legislation has allowed the privatization of port terminals in addition to flexibility in the regulation of the labor force in those locations;

II – Privatization of federal and state roads: the new privatization process in place has significantly improved the roadway system and thus increased transportation times and reduced garage time;

III – Greater usage of waterways: during recent years the government has renovated operational conditions of the Paraguai-Parana and the Tiete-Parana waterways, and their capacity has increased significantly. A new

waterway, Madeira-Amazonas, was built and is operational, carrying some 2 millions tons of soy to the port of Itacoara on the Amazon River;

c) Globalization of the trade and imputs industries: in the second half of the 1990's one can see the imputs and grain trading industries intensely consolidating in Brazil with strong market share concentration among large international players including: Monsanto, Dow Agro Sciences, Dupont, Pioneer, Singenta, Bunge, Cargill, Norks Hidro etc. This massive participation of foreign companies in Brazil's agriculture scenario has brought local producers technology transfer and more credit availability;

d) Managerial Revolution: during recent years, a real revolution has taken place in the management of agricultural activities in Brazil, including lower average production costs (see table below); increased incorporation of technology; improvement of tax controls; increase in machinery utilization; and the increase access to skilled labor and professionals, such as agronomists and agricultural technicians.

Table: 01 – Soybean Production Costs - US$ -

Soybean	U.S.A. Heartland 2000/01	Brazil[2] Paraná 2001/02	Brasil Mt Grosso 2001/02
Variable Cost			
Seed	**18.30**	**5.66**	**4.53**
Fertilizers	**8.31**	**15.96**	**33.24**
Chemicals	**22.58**	**24.51**	**27.13**
Machine operation/repair	**23.11**	**18.77**	**15.40**
Interest on capital	**2.08**	**3.96**	**5.09**
Hired labor	**1.35**	**6.21**	**3.77**
Miscellaneous	**--**	**1.33**	**1.62**
Total Variable Costs	**75.73**	**76.39**	**90.76**
Fixed Costs			
Depreciation machinery/equipment	**50.96**	**14.08**	**16.55**
Land Costs (rental rate)	**90.65**	**12.09**	**2.86**
Taxes and insurance	**7.04**	**3.15**	**3.53**
Farm Overhead	**14.94**	**14.58**	**12.32**
Total Fixed Costs	**163.59**	**43.89**	**35.26**
Total Production Costs	**239.32**	**120.29**	**126.02**
Yield (Bushel/acre)	**45.00**	**40.15**	**44.61**
Variable cost per bushel	**1.68**	**1.90**	**2.03**
Fixed Cost per bushel	**3.64**	**1.09**	**0.79**
Total cost per bushel	**5.32**	**3.00**	**2.83**

Source: CONAB and USDA

Elaboration: Agroconsult

[2] Conab production costs, using data from May/2001, when exchange rate was R$ 2,36 per dollar

2.1. Income in the Primary Sector

The Income in the agricultural sector, with prices of 2.000 totaled US$ 60 billion, according to CNA (Confederação Nacional da Agricultura). However, the income from the entire agricultural sector, including transportation, storage, marketing, and agribusiness production, generated R$ 176 billions. The entire agribusiness market represents 27 % of Brazil's total GDP.

While Brazil's GDP grew to 2.5% during the 1990's, the GDP growth in the agribusiness market was superior, rising to 3.8%. The following chart shows the increases in various sectors of Brazil's economy during the past decade, allowing one to see a comparison among the growth rates.

Table 02 - Increases in GDP and Sectors of Economy

Sectors	1994	1995	1996	1997	1998	1999	2000
GDP Total	6,00	4,30	2,90	3,17	0,15	0,82	4,20
Agricultural	9,30	5,10	3,10	1,87	0,36	8,99	2,90
Lives Stock	7,70	12,00	7,80	-0,14	3,86	5,73	3,30
Industries	7,00	2,10	2,30	5,46	-0,98	-1.66	4,79
Services	4,20	6,00	3,30	1,98	0,75	1,07	3,61

Source: IBGE – Instituto Brasileiro de Geografia e Estatística.

2.2. Public Spending with Agriculture

Gasquez (2001) studied the rubric in the Brazilian federal budget, and discovered some interesting findings:

- Agriculture received 5.7% of the total budget during 1980-1984; 5.5% during 1985-1989; 2.4% during 1990-1994; and 2.1% during 1995-1999. Thus, its allotment decreased every year;
- Another item that leaps out is that of Agriculture's Administration. This alone accounts for 14.5% of Agriculture's budgetary resources, and corresponding to almost three times the expenses of Financial Administration, where the support expenses in rural credit are computed.

In conclusion, although other sectors have received more attention from Brazil's federal government, the agricultural sector has much to offer Brazil's economic development.

2.3. Program PROAGRO and Securitization of Debt of Farmers

In 1973, the Activity Combined Agriculture Warranty Program (PROAGRO) was created with the goal of reinforcing the rural credit use, until the government developed the agricultural insurance. However, the program covered only rural credit, and not losses from production or operations.

Participation the program was compulsory for those who borrowed on credit. Only in 1986 did it become voluntary. The coverage of possible events, as well as the rules, were being embraced, and soon the program started to present elevated deficits of about US$ 150 million a year. In the middle of the 1990's, the compensations of PROAGRO to the farmers weren't paid, in part for because of a budgetary deficit and in part because of contestation in front of the inefficient bureaucratic controls. The program agonized and had to be reformed. In coverage of possible events, spectrum was decreased; controls to exclude losses due to inadequate technology were improved; and adjustments in the producer's aliquots were charged. In consequence of these changes, PROAGRO became equilibrated with positive results.

Another issue to be considered is the debt rescheduling for small, medium and large farmers. The debt rescheduling for small and medium size farmers (called

"securitization") occurred in 1995, when the Federal Government and Congressmen with links in the industry agreed to make the rescheduling of approximately US$ 3.5 billion, of outstanding debt from 350 thousand farmers, which would be paid out in seven annual installments.

In 1998, all outstanding debt larger than R$ 200.000,00 was negotiated under a new program with a more severe rule, and some 70% of those under this category participated. With an estimated R$ 3 billion of debt outstanding the program only covered some R$ 2.1 billion. Also in 1998, the Reco-op Program was established (Co-ops Recuperation Program), which is a credit line for co-ops to modernize and construct long-term strategies. In 2001, all farm credit on the books of the official "Bank of Brazil" was transferred to the National Treasury, within the context of the National Program for the Recuperation of Government Banks.

3. CHAPTER THREE: Rural Credit in Brazil versus Rural Credit in America

3.1. Rural Credit in Brazil

In many developed countries, the ratio of credit to GDP varies between 40% and 60%. In Brazil, this ratio is 20%, with only 0.6% for exports. The precariousness of the stock market is a big snag.

While the government designated R$ 11.2 billion of rural credit for the 2001-2002 crop, studies indicate that R$ 42 billion of credits were necessary for short and long term readjusts to the sector.

Several studies on Brazilian grain production behavior in recent years tried to demonstrate that the correlation between rural credit and the volume produced is low. Thus, that as the rural credit value decreases, production increases. This is the case; however, any credit decrease means a lack of available financial resources for rural producers. The result is that a lot of producers have been forced into debt and into using other financing forms with more elevated interest rates.

In recent years, the National Treasury has had to counterbalance debts with special programs (Securitization, Recoop etc). Some of this credit was for short term (plantation of crop), and not for investments which are the key to propelling sector development.

The difficulty of having a surplus in the balance of payments is that it results in a low rate of internal savings. This makes money very expensive in countries that have a structure like Brazil. When the government seizes upon subsidized credit financing to rural producers and co-operatives, the banks request complementary reciprocity, which is mechanism to increase the profitability of credit operations. The result is that competitiveness for credit brings high costs and rigorous selectivity.

While in developed countries producers have access to credit with the same interest rates that entrepreneurs are charged, in Brazil the primary sector has been less attractive than the urban sector. The risk of the activity, the low liquidity, and the lack of capital are factors that have contributed to this lack of concern. For this reason, the Federal Government has been assuring directly and indirectly about 70% of the total credit for farmers, especially by the Bank of Brazil, whose portfolio has more than US$ 4 billion in loans for the sector. There are two methods that farmers and industries in the agribusiness sector have found to contour the problem of lack of capital: by directly supplying the inputs from the agri-industries with repayment in products and by the agri-industries buying the crops in advance.

3.2. Credit in America

The Agricultural Police in the USA began in the 1930s, after World War I, with President Roosevelt. The first step was electrifying the rural countryside, which was financed in the long term. The agricultural law of 1996, also called the Fair Act and Farm Bill, proceeded to give more emphasis to agricultural insurance and practically froze the official programs based on the support prices. This caused a significant enlargement in direct assistance from the government, in the amount of US$ 24 billions in 2000.

In the USA, the rural credit has basically two systems:

a)FSA –Farm Service Agency, responsible to administrate Commodity Credit Corporation. The FSA also gives emergency loans to cover the production value and the lost of equipment due to natural calamities;

b) FCS – Farm Credit System – private, but organized for agencies patronized by the government and distributed in retail through cooperatives, makes resource capitalization in the market bonds within period of 90 days. FCS has a supervision and regulation organization, the FCA – Farm Credit Administration.

The FCA, with headquarters in Virginia, reports directly to the Federal Reserve Bank. It has two thousand offices around the country, with 67 thousand employees, including 8 thousand from the USDA. The loans take between 30 to 60 days to be granted.

Recent economic research from the USDA concluded that rural financial markets generally work well at supplying credit to local users, and credit for the rural sectors is generally priced comparably to that of the urban credit, but some sub markets are inefficiently segmented. According to the USDA study, problems exist for some rural borrowers in some markets:

- Transaction costs are often higher for rural borrowers whose financial needs are unusually large or complex (by local standards) as they have to shop over a wider geographic area and deal with a broader range of institutions than is typically true in urban settings;
- Access to credit and other financial services remains a problem for those who fail to qualify for commercial loans because of low income, low skill, and a lack of collateral.

Rural banks are adequately capitalized to provide commercial credit to rural sectors, including rural development and rural bank markets which have access to loanable funds from a number of sources. However, rural bank markets are far less competitive than urban markets.

The Farm Credit System, though it is a network of banks and associations, serves as a major source of agricultural credit and is a strong competitor for creditworthy farm borrowers. Its status as a government-sponsored enterprise gives the FCS access to an ample supply of low-cost loanable funds for eligible borrowers.

A wide range of Federal programs serve targeted rural populations, providing expanded financing for agriculture and rural housing, businesses, and communities that have difficulties securing capital on a commercial basis. Most Federal grant and direct loan programs subsidize favored borrower activities, but they do not improve financial market efficiency.

3.3. Comparison Between the Two Systems

The table below shows the main differences between the rural credit in Brazil and that in the U.S.A.

Features	BRAZIL	U.S.A
Market Players	Few institutions, and mainly Governments Banks (Banco do Brasil, Banco do Nordeste, BNDES). Low competitiveness	Large amount of institutions. Mostly private and local lenders (rural and commercials banks). High competitiveness
Subsidies/Amount credit available	Few subsidies and limited credit available, especially for investments	High subsidies and a large amount of credit available
Historical of default	High history of default	Private credit: low history of default Public credit: medium historical of default
Interest Rates	High interest rates, except for specific programs (PRONAF, PROGER etc)	Low interest rates
Credit to finance land and rural houses	None available	Available with low interest rates and long maturity
Collateral	High requirement, Difficult prosecution	Low requirement for small and beginners, medium for medium and large producers; Easy prosecution

4. CHAPTER FOUR: Traditional Evaluation of Farmer's Creditworthiness

The evaluation of agricultural loans has traditionally been based on an analysis of the five primary credit factors. These credit factors, often called the "five C's" of credit for capacity, capital, collateral, character, and condition, remain valid for making sound credit decisions today. For analytical purposes, institutions typically assign a relative weight to each of these credit factors based on the specific circumstances for each individual borrower. The following provides a general description of each credit factor.

4.1. Capacity

Capacity refers to the borrower's ability to repay. The determination of repayment capacity requires an analysis of cash flow, sources of repayment, and earnings history. Cash flow projections should be realistic in relation to past performance and should identify the source(s) of repayment. The source of repayment should be assessed to ensure repayments are expected from normal operations or from other recurring and reliable sources. Earnings history should show that future income is sufficient to meet all obligations, including normal living expenses, with some left over for capital replacement and contingencies. Points of Historic earnings performance to consider include:

- Historic earnings performance;
- Repayment history;
- Stable and reliable income;
- Sources of repayment;
- Projected earnings; and
- Cash flow projections.

4.2. Capital

Capital relates to the ability to meet obligations, continue business operations, and protect against undue risk. The applicant's total assets; working capital and liquidity; amount of equity; contingent liabilities; financial progress; and history of earnings to date are significant measures of a borrower's capital position. Points to consider include:

- Asset/liability structure;
- Working capital and liquidity;
- Owner equity position;
- Financial trends; and
- Earned net worth as a percent of total net worth.

4.3. Collateral

Collateral is the security pledged on the loan. Where applicable, the collateral amount taken must comply with regulatory requirements--it should reasonably protect the lender, provide the necessary control of equity and repayment, and leave the borrower in a position to constructively manage the business. The type, quality, and location of collateral, as well as its ability to produce income, are relevant factors used to assess collateral adequacy. In addition, personal or entity liability in the form of guarantors or partial guarantors may provide added strength in extending credit. Sufficient analysis should be made of credit factors relevant to such guarantors or partial guarantors to ensure that they can reasonably provide support for the loan. Points to consider include:

- Reasonable lender protection;
- Perfected security interest;
- Current and accurate evaluation reports;

- Availability of additional collateral;
- Collateral risk (potential to decline in value); and
- Income producing and debt servicing ability of the collateral relative to its current market value.

4.4. Character

Character refers to the borrower's integrity and management ability. Responsible and cooperative management must be evident. This factor is of such significance that it can affect the weight placed on the other credit factors, particularly if the evaluation of character is negative. Analysis should include a careful evaluation of management of finance and operations. Points to consider include:

- Realistic production and financial goals;
- Adequate financial records;
- Proven management experience;
- Borrower's marketing plan/approach; and
- Compliance with loan terms.

4.5. Conditions

Conditions include the amount of the loan, the use of proceeds, and the loan terms over which the lender has direct control. The conditions of a loan should be constructive in amount and purpose and practical as to repayment terms for both the borrower and lender. Conditions such as loan agreements, personal liability, additional collateral, and insurance should be required as each situation warrants. Points to consider include:

- Prudent and productive loan purposes;
- Past experience in fulfilling conditions;

- Loan maturities coinciding with the purpose of the loan;
- Proper structure of loans financing specific major capital items; and
- Appropriate repayment plans/schedules established that are consistent with the source of repayment.

While the "five C"s is a useful tool, credit analysis should increasingly emphasize the evaluation of the applicant's future debt repayment capacity. This analysis should be based on various sources of information about the borrower that become more reliable and sophisticated as the complexity and size of the farming operation increases.

The analysis should include historical financial indicators, an assessment of the borrower's managerial abilities and a demonstrated willingness to repay the loan. Historical financial indicators can be calculated from previous financial statements and should be used to assess past trends in liquidity, solvency, profitability, efficiency, and debt repayment capacity.

This information is important to lenders as they evaluate the borrower's current financial position and how the borrower has performed in recent years. These indicators should be compared to the lender's underwriting standards to assess the individual borrower's creditworthiness.

Credit scoring models have gained acceptance among agricultural lenders. The popularity of these models stems largely from the cost savings and the shorter time required for loan decisions. In general, credit-scoring models are based more on past lending history and collateral considerations than on the factors that predict the reliability of future income.

Current models have not undergone periods of declining net income experienced during farm crisis in the past; therefore, some degree of uncertainty exists on the reliability of these models.

5. CHAPTER FIVE - New Mechanism to Granting Rural Loans

5.1. Scorecard Lending

Scorecard Lending is a loan-underwriting tool that attempts to statistically quantify a borrower's probability of repayment. This probability is based upon a number of factors statistically substantiated to be predictors of a borrower's willingness and ability to repay his debt. Scorecards can vary by institution, but as with conventional underwriting methods, a borrower's repayment history is an important consideration in determining a borrower's willingness to repay future debt obligations. The assignment of a score to this and other credit factors results in an overall credit score that determines the probable creditworthiness of the borrower.

Factors comprising the scorecard vary by underwriter, as does the level of inherent risk. For example, a term loan scorecard might consider such factors as the percentage financed, the time at present address, the repayment history with the system, the number of years in farming, and the credit bureau information. However, instead of considering the percentage financed, the operating scorecard might consider the ownership equity and net income.

The factors used in developing the scorecard have been determined to be most predictive in separating good from bad repayment prospects. The term "goods" and "bads" are often used in credit scoring circles to distinguish credit prospects. Definitions for "goods" and "bads" vary by user, but generally "goods" are defined as those accounts you would like to have in your portfolio, whereas "bads" are accounts you would decline if you knew how they would perform, e.g., excessive delinquencies, high servicing costs, credit losses, etc.

The acceptance score determined by the underwriter impacts the ratio of "goods" to "bads". Also known as the "cutoff" score. This score is the key to determining the level of risk the underwriter is willing to assume. The higher the required score, the lower the

underwriting risk and vice versa. Establishment of a cutoff score that is reflective of the risk bearing ability of the institution is one of many keys to successful uses of this tool.

5.2. Building an Effective Loan Portfolio Management System

Portfolio management is a continuous process that must include analysis of how business results were achieved, whether such results will continue, and how the institution can maximize its opportunities and provide the greatest benefits to the bank.

5.2.1. Planning and Directing

The board of directors have an important role, because the principal components of an effective loan portfolio management system include strategic portfolio planning, lending policies and procedures, loan underwriting standards, a reliable risk identification program, clearly defined limits for portfolio concentrations, and an internal credit and collateral review.

An institution's board should recognize that loan-underwriting standards are a critical component of effective portfolio management, because they become the foundation that supports the quality, composition, size, and profitability of the portfolio.

A board's strategic business should outline with the plan, the vision, the culture, the profit potential, and the risk-bearing capacity of an institution. The plan should clearly project near term performance, goals, and objectives. It should quantify the expansion and contraction of its interest earning assets, with the intent of providing the best possible return on equity.

Lending policies and procedures are key elements of loan portfolio management, providing direction and control over lending operations and for each authorized lending program. They should be consistent with the goals of the bank and adhere to the principles of sound lending and regulatory requirements.

Board-approved loan underwriting standards should be fully defined in the lending policies to clearly establish the board's minimum standards for creditworthiness and acceptable risk margins.

We could say that a good credit culture seeks to reduce risk while increasing growth and profits through high-quality loan volume. In order to maintain a consistent credit culture, effective communication of board direction through plans, policies, procedures, and underwriting standards is necessary. Otherwise, a Bank can face many problems and increase the risk of the portfolio, reaching huge volume of losses.

5.2.2. Internal Control System

Checks and balances ensure that the institution is meeting program objectives and is adequately protected from unnecessary risk exposure over lending operations. A system of internal controls should include a combination of both preventive and detective controls. The internal control policy from the board must be set and provide guidance to accomplish management objectives, safeguard assets, maintain accurate financial reporting, and ensure compliance with laws and regulations.

For preventive controls, the institution could check: business and capital planning; board policies and procedures; risk parameters; loan underwriting standards; risk identification and castigation systems; delegations of authority, etc.

For detective controls, providing tests on completed transactions could be through: supervisory or management reviews of operations; internal loan review and classification systems; independent internal or external audit; and management's corrective action plans.

5.2.3. Loan Underwriting Standards

Each institution should establish loan-underwriting standards for the various loan products and purposes for which funds are advanced. These standards have to be linked with the institution's credit procedures, detailing how credit policies will be implemented.

Underwriting standards clearly define, in measurable terms, the desired credit criteria for granting acceptable loans. Acceptable loans may be categorized under three key areas: creditworthiness; documentation and file completeness; and legal and policy compliance. The appropriate evaluation of these three areas before loans are booked will

reduce losses and will be more effective than would be the best loan workout skills that could be used after a problem loan has been advanced.

According to FCA manual examination, underwriting standards should include the following:

- Assessment of the loan's purpose and associated repayment program (primary and secondary);
- Evaluation of the major loan credit factors – character, capacity, capital, condition, and collateral;
- Evaluation of loan legality;
- Determination of the economic benefits (risk-return) to the institution;
- Assurance that speculation is prohibited; and
- Assurance that loans originated are within the institution's area of expertise.

Once these components are assessed, the institution may weigh the scoring of the components in accordance with its perceptions of importance.

5.2.4. Management Information System

MIS is the system that provides timely information on the condition, quality, and performance of the loan portfolio to enable the board and management to make informed and prudent decisions on credit extensions, controls, and risk exposure.

Each institution must have an MIS to provide this information. By using a comprehensive loan accounting system and a general ledger system, MIS can provide reports of the institution's financial condition and operating results, and can support the internal control system.

According to FCA manual examination a good MIS should have a capacity to demonstrate:

- Systems Integration – The MIS should be capable of accepting multiple data entries to effectively integrate borrower financial and credit information with the loan accounting system;
- Current and Accurate Data – Internal controls should provide reasonable assurance that MIS data is accurate, updated, and maintained. Credit procedures should provide detailed and specific guidance for calculating loan underwriting standard rations to ensure consistent and comparable data throughout the portfolio and over consecutive time periods;
- Integration With Capital Planning and Allowance for Loan Losses – The MIS should be linked to, and facilitate, the institution's process for periodically analyzing and determining the allowance for loan losses and capital adequacy, as well as information to determine loss exposure (probable, potential, or remote possibility) based on credit quality, collateral position and other measurable portfolio risks;
- Compliance With Underwriting Standards – The MIS should identify and report each loan's compliance with the approved underwriting standards (where standards are quantifiable) and clearly and continually report exceptions that fall outside the underwriting standards; and
- Risk Monitoring – To effectively monitor portfolio risk, institutions should have a loan accounting system that incorporates risk parameters, loan underwriting standards, and interest rate assignments with the collection and analysis of borrower financial data.

5.2.5. Monitoring

One of the key elements that boards should address in developing an institution's policies is the establishment of management reporting requirements. The policy should generally describe what is to be reported to the board, as well as the frequency and the content of the reports. The board must also define and periodically adjust its reporting requirements to ensure that it receives adequate information to monitor portfolio

performance in relation to board objectives and goals as well as to the changing conditions and risks in the lending environment.

On a routine basis, management should summarize and report all loan actions completed under delegated authority, and ensure that management reports all loan actions that are exceptions to policy or loan underwriting standards or that are outside the board's delegated authorities.

5.2.6. Risk Evaluation

The goal of a portfolio risk analysis is to determine the number and volume of loans outstanding by predetermined categories, such as loan quality classes, primary commodity, branch office, loan officer, size of loan, or various financial or performance ratios.

FCA manual examination refers to this process as "slicing and dicing" portfolio information, bringing an overall characterization of the institution's principal assets, including the concentration of loans in specific ranges or commodity groups. This method allows assessment of the current performance of key portfolio segments.

The current financial position of all dairy farmers in the portfolio could be examined, determining the number and amount of dairy loans in specific ranges for such key ratios as debt-asset and term debt coverage or other ratios used as loan underwriting standards.

Another approach to portfolio analysis is based on the institution's current performance and its capital position. This type of analysis requires data from the institution's current or projected balance sheet, income statement, and the sources and uses of its funds statement. The primary goal is to assess the institution's profitability relative to risk exposure.

Other indicators should focus on the capitalization, asset quality, and liquidity of the institution and its financial statements. Profitability indicators should focus on operating efficiency and rates of return.

6. CHAPTER SIX: Stress-Testing Agricultural Loans

The capability to project the impact of external factors through stress-testing can help management assess the downside risk associated with the future debt repayment capacity of a particular account as well as the ability of existing underwriting standards to correctly separate potential good loans from bad loans.

According to Peter Rose, "not only is it useful to look at historical data in a sources and uses of funds statements, but it's also extremely important to estimate the borrower's future sources and uses of funds and its statement of financial position." He suggests that a lending institution would be well-advised to carry out a simulation analysis of the borrower's future financial condition, assuming different environments, and seeing what the consequences are for the firm's pro forma balance sheet, income statement, and sources and uses of funds statement.

Institutions form expectations of future debt repayment capacity based upon a most likely scenario. Some institutions project future income levels by taking the average of past income levels. Others may use country average yields for crops and then multiply corresponding production levels by an agreed price for each commodity. Others may form expectations based on published annual outlook information. Borrower income is stressed by assuming a decline in the price of a particular commodity or by a drop in the level of income itself.

But, such ad hoc stress testing not only ignores the effects that such a price change has upon other commodities and asset values in a broader market context but also fails to address the reason why these prices are changing.

According to John B. Penson Jr., an alternative to ad hoc stress-testing is "event stress-testing" based on projections provided by structural econometric models that address inter-market relationships in agriculture, and the effects of domestic policy and global events. The user must form expectations on the "most likely" combination of macroeconomic, farm commodity, environmental and trade policies that will exist over the forecast horizon. The commodity prices, unit input prices, and asset values projected by this model under a most-likely set of external factors are then used in a simulation analysis

like that suggested by Rose to project the pro forma financial statements for the borrower's operations in a whole farm context.

Calculations of generally accepted measures of liquidity, solvency, profitability, debt repayment capacity, and economic efficiency, based on the projected financial statements, can be used to extend past trends for these financial indicators. This would allow an assessment of trends in specific financial indicators over the last three years as well as the next three years, focusing on the borrower's future ability to meet existing term debt commitments under a set of events that have the highest expected probability of occurrence.

Once the most-likely scenario has been simulated and assessed from a credit risk perspective, the next step involves developing second set of pro forma financial statements reflecting a borrower's future ability to repay existing term debt if unexpected adverse events, which are beyond the borrower's control, occur. The goal is to assess the resiliency of projected debt repayment capacity.

Thus, the benefit to lenders of event stress-testing is the insight gained by comparing the two or more sets of pro forma financial statements tied to specific market events, and what they say about potential exposure to credit risk and asset devaluation. The goal is to recognize potential cash flow stress and adverse collateral signals before making the loan or, in the case of an existing borrower, before it is too late do take proactive measures.

The information technology revolution, complete with increasingly sophisticated analytical software, makes event stress testing possible today. Whole farm simulation models that incorporate periodically updated trends in commodity prices, unit input costs, land values, and other key external factors under alternative aggregative scenarios can provide the basis needed for event stress-testing in agriculture.

FINAL COMENTS

Brazil initiated a broad reform in agriculture during the 1990s, which has already resulted in increased competitiveness. The process of gaining competitive advantage in the agribusiness sector will be intensified in the coming years. The "Free Trade of Americas Agreement" will bring a fast and intense opening of all rural economy, elimination of all price support mechanisms, and a progressive phasing-out of the main commercial agriculture policies. Thus, if Brazil's banking system is prepared, and feels confident, to lend to the agricultural sector, more and more funds could be invested in these sectors, bringing benefits for the whole economy and the country.

According to Todaro and Smith (2002), there are three main conditions for general rural advancement:

- "modernizing farm structures to meet rising food demands, including a land reform;
- supportive policies from the government, providing the necessary incentives, economic opportunities and access to needed credit; and
- integrated development objectives, that mean efforts to raise both farm and nonfarm rural incomes through job creation, rural industrialization, and the increased provision of education, health and nutrition, housing and a variety of related social and welfare services".

Our firm belief is that Brazil can achieve these conditions, and, even more, make the agribusiness sector grow, promoting high development of the whole economy.

We have many lessons to learn from the past, and these should be incorporated in any institution's philosophy for granting new loans. The future success of each institution depends upon the proper manner in which they identify and manage the credit risk in its portfolio.

Implementation of a Loan Portfolio Management Policy can bring many good results. Moreover, when properly established, approved, and implemented, the components of a Loan Portfolio Management Policy can provide the controls for an institution to maintain its operations in a safe and sound manner.

In addition, it is necessary to not only institute good portfolio management in the present time when granting loans, but also to make realistic projections of future scenarios, using stress-testing models for individual loans, loan portfolio segments, and for the institution itself.

Finally, the use of price hedges by producers has become quite common. These include instruments such as futures and options from Brazilian Futures Exchange (BM&F), as well as forwarding contracts with trading and wholesale companies. A growing number of brokers, banks, insurance companies, consultants, and even input companies have helped farmers keep updated with market conditions and to minimize price risk.

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