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**RURAL
CREDIT
INSURANCE
IN LATIN
AMERICA**

**ANNUAL
REPORT
1981
SUMMARY**



Inter-American Institute for Cooperation on Agriculture

Division of Agricultural Insurance and Credit

AGRICULTURAL CREDIT INSURANCE IN LATIN AMERICA

SECOND ANNUAL REPORT

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— SUMMARY —

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1. CREDIT INSURANCE

INTRODUCTION

Agricultural Credit Insurance is a mechanism which, when made available to farmers, protects them in the event of natural disasters. Its aim is to protect investment against the catastrophic effects of natural hazards and diseases that cause crop failure, animal death or loss of their functions. By purchasing an insurance policy, the farmer protects his loan, or a portion thereof. If the harvest (or part of it) is lost, or if the animal dies, the insurance agency pays the bank the amount due, thus allowing the farmer to return to production without seriously decapitalizing his resources.

Insurance, therefore, serves not only to protect the farmer's capital but also enable him to obtain credit after a disaster that otherwise would have left him in debt. In addition, insurance dramatically alters the farmer's debt-to-equity ratio and permits him to absorb far more debt than his capital investment alone could guarantee. As a result of increased debt-bearing capacity, he is able to invest in productive new technologies that are so expensive that even a single failure could endanger the enterprise.

Insurance also helps level income fluctuation across years. It lessens the burden of losses in one season or in one or more areas by spreading it over broader areas. As far as the farmers are concerned, they are assured of a minimum protection against the uncertainties of crop yield. From the lenders' view of point, the insurance is a strong guarantee of recovery. From the point of view of the political and economic system, insurance precludes the need to mount expensive ad-hoc disaster efforts as the insurance system itself is able to offset losses from the reserves collected in good years and in unaffected areas.

unpredictable losses, spreads risk among producers and various crops, and over regions and time. In spreading risk, insurance not only contributes to the security and stability of farm income, but to the greater economic stability of the rural community in general. By assuring repayment of loans, crop credit insurance prevents the decapitalization of credit sources which serve the community while requiring less recapitalization on the part of the government to the bank for the indebtedness of farmers as a consequence of natural disasters. As a result, the lending agency is able to direct a larger portion of its portfolio to projects that increase production and productivity. For all these reasons, credit insurance is increasingly viewed as a necessary component in modern rural development programs.

The theoretical advantages of credit insurance have been known for many years and, in fact, some developed and developing countries have already set up insurers to take advantage of them. However, it is only recently, with the full implementation of the IICA/AID Agreement (AID/LAC-IGR-1297) that systematic research has been conducted on the structure, administration, and financing of these insurers. In 1980 and 1981, the IICA research and development work began the process of accumulating a body of knowledge adequate to enable other countries to set up efficient and effective insurers without a lengthy process of experimentation and learning.

A second important aspect of the project has been to study en vivo the economic impact of the introduction of agricultural credit insurance on both the producer and the lending institution. The first results of this research became available in 1981. In almost all cases, the initial results argue strongly for the creation and operation of agricultural insurers, but also caution that the agricultural insurance must be viewed in the context of overall economic policy. That is, the research to date clearly suggest that while the benefits of insurance are positive, it is only one of the agricultural risk management strategies required to develop a stable, productive

agricultural sector. Agricultural insurance is in no way a substitute for other programs such as effective price and credit policies. It is instead an important and complementary part of an integrated agricultural sector development policy.

2. INSTITUTION BUILDING AND GROWTH: PANAMA, ECUADOR AND BOLIVIA

A. Summary of 1981 Developments

In the third year of the program, Ecuador entered the ranks of Latin America countries with agricultural insurers by issuing its first policies for potatoes and rice. Bolivia expanded its operations to cover other crops in addition to the potato insurance program begun last year. At present several vegetable crops and livestock are insured. The livestock programs are commercially reinsured in Bolivia. Premium income remain quite small, and the Aseguradora Boliviana Agropecuaria continues its planned, measured expansion to

new crops and new areas. Soon two additional regional offices will be opened and several new crops insured. The Panamanian insurer continued its steady growth and continued to produce acceptable loss ratios as it expands to a nationwide program offering coverage for 6 major crops as well as cattle and swine insurance.

B. Panama

The Panamanian insurer, the Instituto de Seguro Agropecuario (ISA) has grown in both its agricultural and livestock operations. The following tables show the development of the total portfolio as well as disaggregation by its two components. In the last cycle, ISA issued over \$ 13 million in coverage with approximately 1/2 of the total in livestock, and 1/2 in crop insurance. The financial results of the insurer continue to be positive, producing a loss ratio between 1976 and 1981 of slightly over 70 percent, and enabling the insurer to gradually capitalize a reserve without using the government guarantee of \$ 1 million.

In addition to the positive financial performance, ISA has expanded the options insured. At present, rice, maize, sorghum, irrigated tomatoes, beans, onions, feeder

TABLE 1
COMBINED ISA CROP AND LIVESTOCK OPERATIONS
(US dollars in thousands)

Year	Coverage		Premium Income		Indem- nities	Loss Ratio
	\$	Growth	\$	Growth		
1976-77	25 898	—	1 165	—	1 588	1.36
1977-78	1 129 579	4,362%	58 723	4,940%	17 784	0.30
1978-79	2 636 498	233%	113 815	94%	102 462	0.90
1979-80	8 131 592	308%	331 567	191%	194 642	0.59
1980-81	13 114 208	62%	519 579	57%	402 143	0.79

cattle, breeding cows, semen bulls, and swine are insured. Potato insurance and group life insurance will soon be included. The premiums remain modest ranging from 7 percent for onions to 3 percent for feeder cattle. The entire portfolio is now reinsured under a quota-share treaty with a large European reinsurer.

ISA continues to function as a

training center for new employees of agricultural insurers elsewhere as well as a demonstration project for interested policy makers. In 1981, ISA trained groups from Ecuador and Venezuela in agricultural insurance technology. High level delegations from Bolivia, Colombia, Nicaragua, and the Dominican Republic visited Panama to observe a functioning agricultural insurer.

TABLE 2
ISA CROP INSURANCE PROGRAM
(US dollars in thousands)

Insurance Year	Hectares		Coverage		Premium	Income Growth	Indemnities	Loss Ratio*
	No.	Growth	\$	Growth	\$		\$	
1977-78	5 401	--	1 124.6	--	58 723	--	17 783	0.30
1978-79	7 307	35%	1 887.5	67%	103 700	78%	93 730	0.90
1979-80	13 988	92%	4 575.7	142%	269 600	160%	130 451	0.48
1980-81	16 183	16%	6 806.6	49%	356 300	32%	290 013	0.81

* Unloaded loss ratio where $LR = \frac{\text{indemnities}}{\text{premium}}$

TABLE 3
ISA LIVESTOCK INSURANCE PROGRAM
(US dollars in thousands)

Year	# Of Animals	Growth	Coverage		Premium Income		Indemnities	Loss Ratio*
			\$	Growth	\$	Growth		%
1978-79	3 392	--	748 987	--	10 074	--	8 731	0.87
1979-80	11 677	244%	3 555 862	375%	61 937	515%	64 191	1.04
1980-81	18 969	62.4%	6 307 071	77.4%	163 318	163.7%	112 130	0.69

* Unloaded loss ratio $LR = \frac{\text{indemnities}}{\text{premium}}$

The three years of the IICA/ISA collaborative agreement have been years of very rapid growth. At present, ISA is a highly professional agricultural insurer with nationwide coverage. ISA has begun to develop insurance programs for private sector banks in order to protect even more of the credit extended to the Panamanian agricultural sector. ISA also provides an excellent research laboratory to test the effect of credit insurance upon farmer and lender alike. Most of the results in the following section on the research component of the project have been obtained in Panama. ISA is on the threshold of becoming a viable, self-sustaining national level insurer which can continue to grow and finance its activities without further technical and financial assistance.

C. Bolivia

The Bolivian Agricultural Credit insurer (ASBA) during 1981 faced extraordinarily difficult conditions arising from three distinct but related sources. The Bolivian government changed several times while the economy continued in crisis, and at the same time the state-owned agricultural development bank, Banco Agrícola Boliviano (BAB) virtually ceased agricultural lending due to a heavy loss of capital. This deprived ASBA of the main source of loan funds to be insured.

From the project's point of view, the most important result of this economic situation was that a devaluation of the Bolivian Peso produced a loss of reserves in dollar terms, notwithstanding an excellent return on investment in Bolivian Pesos.

Despite this difficult situation, ASBA was able to carry out its initial pilot operation of potato insurance in Cochabamba as well as initiate pilot onion, white bean, carrot, beet, and maize pilot operation in new areas near Cochabamba. The very favorable results of the first cycle of potato insurance is covered in the research section. In addition, approval was received to initiate livestock insurance operations. The first coverage for livestock will be for a large herd imported from Uruguay by the

Interamerican Development Bank. ASBA has also obtained approval to issue credit life insurance, and will issue the first policies in 1982.

The legal structure of ASBA is undergoing a fundamental change. ASBA requested the approval of the insurance superintendent to change to a mutual structure. It has already received the approval of its Board of Directors to do so. There are numerous advantages to a change of legal structure including an increased ability to hold reserves in hard currencies, a more speedy, less bureaucratic management style, and a more stable reinsurance relationship. It is expected that this change will be completed during 1982.

Given the problem of the decapitalization of BAB, ASBA began negotiation with other lenders of production credit after it successfully concluded an agreement with PL-480's Executive Committee allowing it to utilize the donated reserve for insurance of non-BAB loans. ASBA signed an agreement to insure credit extended by Banco de Cochabamba, the Cooperativa Integral de Desarrollo "Cochabamba Ltda.", the Corporación de Desarrollo de Santa Cruz, the Cooperativa Culli Culli Alto Ltda., and the IBD financed livestock project. In 1982, most of these agreements will be put into effect for the first time.

Although the insurer is entering only the second cycle of operations, ASBA was able to obtain quota-share reinsurance for its livestock and credit life business. Reinsurance for the crop portfolio is being negotiated.

While the growth of the Bolivian insurer has been slowed by economic and political conditions beyond its control, 1981 was a successful year in terms of increasing coverages and diversifying risks by crops and by geographical and climatological zones. The present reinsurance program should permit ASBA to greatly increase its writings as soon as the conversion to a mutual is completed.

D. Ecuador

The Ecuadorian insurer, CONASA, was organized and began operations in 1981. At present, CONASA's capital is 89 percent public and 11 percent private. Its initial reserve of 5 1/2 million Sucres (\$ 210 000 at current official exchange rates) will be gradually augmented by annual contribution from the present stock-holders as well as by the sale of additional stock to the private sector.

CONASA's initial insurance operations were in Carchí Province in the northern part of Ecuador. On a pilot basis, 42 potato insurance policies were issued covering 163.5 hectares for a total coverage of about 5 million Sucres (\$ 190 000 US). The premium income was 350 000 Sucres (\$ 13 500 US) while indemnity payments were less than 200 000 Sucres (\$ 7 700 US). The average size of the producers insured was 3.89 hectares. At present an additional 22 requests for insurance for 81.5 hectares with 2.5 million Sucres (\$ 96 000 US) of coverage are pending. Most will be accepted after the germination inspection.

The initial potato insurance operation was quite small in scale and designed as a learning experience for the insurer's staff as well as a test of the administrative and financial systems. The first field tests indicate that CONASA can now begin to grow to meet the surprisingly strong demand for insurance.

Following the potato insurance pilot operation, CONASA initiated another pilot for coastal rice. Late approval of the forms by the regulatory agency restricted coverage to a few producers and only 86.5 hectares. However, the winter rice coverage should in its initial year protect about 1 800 hectares with over 20 million Sucres (\$ 770 000 US) of coverage.

The livestock insurance program is approved and CONASA will soon begin insuring cattle in two different zones. In addition, maize insurance will also be added to the rapidly growing CONASA book of business.

CONASA, like its Bolivian counterpart, has successfully completed its organization and obtained approval to insure several staple crops and livestock. In 1982 and 1983, CONASA has programmed a gradual expansion to other regions and crops. Its organizational strength as well as the quality and dedication of its field staff is impressive for a new insurer. Baring very adverse experience, CONASA is on the way to becoming a viable nationwide insurer.

3. RESEARCH RESULTS

A. Background

The research effort was initiated late in 1979. During most of 1980 the activities were devoted to defining the research questions and designing the methodology. Data collection and organization were initiated in 1980. In 1981, the project provided the first results of significant value.

The nature of agricultural credit insurance is such that it can have effects on the farm and sector levels as well as on administration of agricultural credit systems. The development of an efficient insurer in turn requires a through understanding of the nature of agricultural risk and the development of new administrative and financial strategies for the insurer. Hence, the research program is being carried out at these four levels: the farm, the sector, the banks, and the insurer. Since the research program must wait for the creation and development of the insurers, the different components are often carried out with different intensities in each of the countries.

The research program relies heavily, but not exclusively on quantitative technics: statistical analysis and optimization models. Important conclusions are also derived from anthropological research. To make the quantitative studies possible, a significant effort is devoted to data collec-

tion, organization, and analysis. There are four basic sets of data: a) Historical information on weather variables, areas planted, yield, prices, credit, and other variables; b) the actuarial experience of the insurers; c) surveys of specific areas and groups of farmers participating in the program as well as of control groups, and finally; d) financial data on the insurers' and the banks' portfolios. These data, generated in the countries, are processed there when possible and stored in a permanent data file at IICA's Computer Center in San José. The center has an IBM/360-40 and a software package which includes SAS (for statistical analysis) and MIPSOX (for the solution of mathematical programming models).

The data file currently includes 13 records: Five surveys (conducted in 1980 and 1981) of farmers receiving insurance and control groups in Panama and Bolivia; one historical data base (for 23 countries) of agricultural, economic and financial variables for the period 1960-1980; four insurance portfolio data sets for Israel (1967-1979), USA (1950-1980), Costa Rica (1970-1980) and Panama (1977-1980); one disaggregate data file for the Panama insurance program; one disaggregated data file for the Panama Agricultural Development Bank and; a file of portfolio composition of 132 development banks in Latin America (1975-1980) which provide credit to agriculture. The file also includes various farm and sector level programming models and portfolio models for the ISA and BDA.

The research program is conducted by an Agricultural Economist in San José as coordinator of the program; an Agricultural Economist in Panama, partly responsible for the administration of the relations IICA and ISA; two Research Assistants, one in San José and one in Panama; two members of ISA and ASBA staff and various consultants hired on a short term basis.

B. Findings of the Research

The output of this research project will include both methodological contribution as well as the empirical findings about

functioning insurers. This is then the first time that agricultural insurance is being evaluated *in situ*. Most of the opinions expressed about agricultural insurance up to now, were derived from theoretical frameworks applied to crop production records, from which conclusions about whether insurance would or would not have been a valuable stabilization policy were derived. These theoretical conclusions were seldom compared with the actual experience of functioning insurers.

The analysis at the four levels is of two types. First, the measurement of the expected effects of insurance which allow us to tell how it actually did work. Second, *ex-ante* simulations via mathematical models that permit testing within the realm of theory and the limitations of modeling of how alternative insurance schemes would work under different scenarios.

An *ex-post* analysis of the farm level impact of insurance is reported in the works of Pomareda and Fuentes (1981) for tomato producers in Panama. Ccama and Pastor (1981) and Gudger (1981) do the same for potato producers in the highlands of Bolivia, and Heckadon (1981.a and 1981.b) carried out an attitudinal survey for farmers and livestock producers in Panama.

In the case of industrial tomato producers in Panama (Pomareda, 1981) insurance allowed farmers to increase their average net income in two regions where coverage was offered, Cocle and Los Santos, and where insurance indemnities were of \$ 163 and \$ 400 per hectare respectively. The net income of insured farmers was 4.3 percent and 32.23 percent higher than that of non-insured farmers in the same regions. Currently all farmers in Panama have insured their tomato production activities.

In Bolivia, a cooperative effort of ASBA, the Instituto Boliviano de Tecnología Agropecuaria (IBTA) and Banco Agrícola Boliviano (BAB) made it possible for small producers in Cochabamba to successfully adopt a modern input-intensive technology for potato production. During the year of the project, yields increased over

100 percent with respect to the previous year. Also the proportion of higher grade potatoes increased from 30 to 45 percent of the production. Although costs of production were greater, net farm income rose by 26 percent. The development cost of the program was high. Nevertheless, these costs are properly seen as an investment with (positive net) returns spread over many years since farmers have decided to continue using the modern technology.

Studies by Heckadon reveal that in general there is a positive attitude toward voluntary insurance if farmers have adequate information as to how it functions. In general, farmers rejected the principle of compulsory insurance as this, they said, made credit more expensive. As this is an important issue, ISA has increased its information program to provide insured credit recipients with a better understanding of the program. All farmers and livestock producers were strongly in favor of reducing the administrative costs of official credit.

The ex-ante analysis of expected insurance effects of the farm level were done with a Linear Programming model developed and reported by Arcia and Hazell (1982). This risk programming model was applied to small (5 hect.) farms in the district of Bugaba, Chiriquí Province in Panama. The farms are highly diversified, semicommercial and grow an average of two insurable crops per unit. Model results indicate that the typical farmer in Bugaba will not be significantly affected by the presence of insurance under present conditions. In addition, such farmer would not have purchased insurance on a voluntary basis.

The principal reason for the above results relates to the relatively high premium rates for this particular district, and the high yield variation required for the activation of the insurance mechanism. These conclusions might be modified as more data become available since the current time series of yields is short and insufficiently disaggregated. Meanwhile, new premium rates for the different regions of

Chiriquí, Panama are being developed in order to make insurance a more attractive proposition.

The Bugaba results' apply to a very peculiar situation, hence no generalization can be made about the benefits of insurance until the research is repeated in other districts which do not enjoy the excellent agricultural climate of Bugaba. These results were also in substantial measure contradicted by the benefits reported for several insured regions of Mexico.

The impact of crop credit insurance on the credit delivery system is not conclusive. In terms of default rates, the Agricultural Development Bank of Panama (BDA) has received the full benefits of insurance for those cases involving climatic risk. However, preliminary studies have found that climatic risk accounts for only 25 to 30 percent of the total default risk faced by the bank. The remaining 75 percent is caused by moral hazard or other causes not covered by insurance.

An analysis of the BDA loans, done by Pomareda (1982), also reveals that the actual maturity (duration) of insured loans is equal to the expected maturity of the loan, while non-insured loans have actual maturities that are on the average 30 to 40 percent longer. Since keeping a loan on the books and prosecuting delinquent accounts is a major cost for agricultural development banks, there is a cost reduction effect of insurance. Insurance has effectively decreased defaults caused by climatic risks to zero and has eliminated the cost of attempted recovery. This same analysis shows that insurance does have a positive effect on accelerating bank growth, yet this potential contribution cannot be fully realized until the banks upgrade their own management and financial policies.

The desirability of insurance is a function of its costs. It has become evident that portfolio composition, premium determination procedures, operating costs and other factors are important determinants of financially successful and socially beneficial agricultural insurance programs (Pomareda,

1982). Having recognized the importance of these issues, a portfolio management model for the insurers was proposed by Arcia and Hogan (1981) and later refined and applied to the case of Panama by Arcia (1982).

The portfolio model was the result of a series of research activities at the level of the insurance agency. These were concentrated on data gathering, organization, and processing for premium rate making, and the implementation of the portfolio model itself. The principal technical coefficients developed were the loss cost (the ratio of indemnities to liabilities) per option in the portfolio and the administrative cost per option. In addition, the province of Chiriquí, the most important province in the portfolio, was thoroughly mapped with respect to crop technologies, costs of production, crop zones and ecosystems. These coefficients will be used to determine insurance coverages and premium rates more adequately. The model will be refined to include physical resource constraints and the investment portfolio.

The results for the portfolio selection model indicate that under present conditions, crop credit insurance is not yet viable on a commercial basis in Panama. The high premium rates required to justify a self-sustaining mechanism are not acceptable to small farmers. However, the results also indicate that by lowering the administrative costs and/or generating additional income through improved management of the investment portfolio, it is possible to reach a break-even point. Given the highly atomized clientele, the social nature of the current program, and high cost of providing insurance to small farmers, the results are highly encouraging.

Once again the conclusions offered here are the product of research in progress. The 1982 output is expected to provide more reliable conclusions, and will serve as benchmark for research on agricultural insurance. The Major Forthcoming Publications are listed in the Bibliography of this report.

4. THE DEVELOPMENT OF A HEMISPHERIC AGRICULTURAL INSURANCE SYSTEM: PROGRESS AND PERSPECTIVES

As the initial stage of a three-stage project moves into its final two years, it is possible to offer several tentative conclusions together with a commentary on the probability of developing a hemisphere-wide system.

1. Our initial work strongly suggests that agricultural insurance is feasible, notwithstanding the catastrophic risks inherent in agricultural production. There is reasonably good evidence that technical, administrative and financial systems can be developed to create self-sufficient, self-capitalizing insurers capable of reaching a broad nationwide clientele. It is increasingly clear that the clientele of the insurer must be commercial market-oriented farmers or those who have the capacity to become so. Agricultural insurance is of relatively little use to subsistence-oriented farmers as most of their risks arise from other than yield variation.
2. While self-sufficient agricultural insurers are feasible and beneficial, their development is a medium-to long-term process. From a very small beginning, these insurers require 5-10 years to reach nationwide scale and to become an important force in agriculture. Attempts to bypass or hasten this process by establishing large-scale schemes have usually produced little results, and have required heavy payment of subsidies to support

them. Unfortunately, a large number of these heavily subsidized insurers now exist around the world. By expanding coverage slowly as experience is gained, insurers can become self-sustaining entities. Administrative support will be required only for the initial stage while the insurer is an "infant industry," and can gradually be diminished as the insurer reaches an economy of scale. No permanent subsidy should be required except to groups that government wishes to serve on social grounds.

3. If agricultural insurers are to succeed, it is imperative that they be managed as if they were a private for-profit enterprise. The decision-making process must be based on technical, not socio-political considerations. This in no way implies that agricultural insurance may not serve socio-political ends. Those governments which chose to subsidize agricultural insurers so as to extend the risk management services to sectors that would be too expensive to serve, should do so through an overt administrative or premium subsidy.
4. The quality of management is as critical a variable in determining the success and failure of the insurer as is the actual loss experience of the insurer in the field. It is our experience that this obvious truism is almost always ignored in practice. Little or no thought at the planning stage is given to incentives to promote entrepreneurial behavior; to developing flexible personnel systems that reward achievement; to freeing management from cumbersome bureaucratic decision-making; and, finally to developing a strong sense of cost-effectiveness and

"bottom-line discipline." Without careful, explicit design the new insurer runs two equally dangerous risks. First, without incentives for entrepreneurship and without substantial managerial autonomy, the insurer may select a small, safe clientele and halt growth. Second, if management is not cost conscious, a large expensive bureaucracy is likely to emerge.

The perspectives for developing a hemisphere wide system of agricultural insurance with the capacity to spread risks over the entire continent appear to be quite bright. The three project countries, Panama, Ecuador and Bolivia have functioning insurers. In addition, the project staff helped Venezuela to launch an agricultural insurer and provided technical assistance to Chile which also established an agricultural insurance program in a private company. Of these programs, Panama, Bolivia and Chile have obtained commercial reinsurance. Ecuador and Venezuela should obtain reinsurance within a year.

Several other countries have requested and received technical assistance from the project staff. Peru is actively planning for the establishment of an insurer in 1982. Colombia, Paraguay, Honduras, Nicaragua, Jamaica, the Dominican Republic, and Trinidad and Tobago are in the feasibility study stage. It is likely that from this generalized interest that several additional insurers will be established. The international reinsurance market has shown a willingness to provide markets for sound, technically competent, well-managed insurers at very early stage of development, indeed in some cases at the very outset of operations.

On balance, the perspectives for the development of a hemisphere-wide system of agricultural insurance are positive. It must, however, be remembered that the Latin America agricultural insurers are new and fragile institutions. A very considerable amount of local administrative talent must be combined with external technical

assistance if these new insurers are to grow into a strong, technically competent, self sustaining insurers.

5. BIBLIOGRAPHY

A. Journal Articles

HAZELL, P.B.R. and C. Pomareda. "Evaluating Price Stabilization Schemes with Mathematical Programming Models." *American J. Agric. Econ.* 63(3):550-556, August 1981.

GUDGER, W.M. "Análisis Preliminar del Primer Ciclo de Seguros en Bolivia: Una nota de Investigación en Marcha". *Desarrollo Rural en Las Américas.* 13(3):173-177, Set.-Dec. 1981.

POMAREDA, C. "Investigaciones sobre Seguro Agrocrediticio e Implicaciones para su Expansión en América Latina". *Desarrollo Rural en Las Américas.* 13(3):161-172, Set.-Dec. 1981.

B. Papers Presented at Seminars and Conferences

ARCIA, G. "Portfolio Management and the Design of Insurance: The Case of Panama." Paper presented at the IICA-IFPRI Conference on Agricultural Risks, Insurance and Credit in Latin America, San José, Costa Rica February 1982.

AGUIRRE, J.A. y C. Pomareda. "Riesgo en la Producción Agropecuaria Desarrollo Agroindustrial y el papel del Seguro Agrocrediticio". IICA-Proyecto de Seguro Agrocrediticio. Documento presentado en el Seminario de Montevideo sobre Desarrollo y Financiamiento Agroindustrial, agosto 1981.

GUDGER, W.M. and L. Avalos. "Planning for the Efficient Operation of Crop Credit Insurance Schemes." Paper presented at the IICA-IFPRI Conference on Agricultural Risks, Insurance

and Credit in Latin America, San José Costa Rica, February 1982.

GUDGER, W.M. "On Organizing Agricultural Insurance in the Windward Islands" IICA, Agricultural Insurance and Credit Project, March 1981.

GUDGER, W.M. and C. Pemberton. "Seminar on Agricultural Insurance Trinidad & Tobago." April 1981.

HAZELL, P.B.R., L.M. Bassoco and G. Arcia "Insurance and Farm Cropping Studies in Mexico and Panama." Paper presented at the IICA-IFPRI Conference on Agricultural Risks, Insurance and Credit in Latin America, San José, February 1982.

C. AGROCREC Series

GUDGER, W.M. and N. Maurice. "Una Propuesta para el Establecimiento de un Programa de Seguro Agrocrediticio". AGROCREC No. 01-80, febrero 1980.

POMAREDA, C. "El Seguro Agropecuario y la Expansión del Crédito" Paper presented at ALIDE-IICA, Seminar on Development Banks and Agricultural Credit, San José, Costa Rica. AGROCREC No. 02-80, febrero 1980.

POMAREDA, C. "Introducción al uso del Programa SAS para Análisis de Regresión". IICA-Proyecto de Seguro Agrocrediticio. AGROCREC No. 03-80, junio 1980.

POMAREDA, C. "Introducción al uso del Programa MPSX para resolver modelos de Programación Lineal". IICA-Proyecto de Seguro Agrocrediticio. AGROCREC No. 04-80, agosto 1980.

GUDGER, W.M. "El Seguro Agrocrediticio y su papel en la promoción del Desarrollo Rural". IICA-Proyecto de Seguro Agrocrediticio. AGROCREC No. 05-80 noviembre 1980.

- POMAREDA, C. "Metodología de la Investigación y Primera Evidencia Empírica de los Efectos del Seguro Agrocrediticio". IICA-Proyecto de Seguro Agrocrediticio, AGROCREC No. 06-80, noviembre 1980.
- POMAREDA, C. "Justificación y Viabilidad del Seguro Agrocrediticio en el Perú". IICA-Proyecto de Seguro Agrocrediticio, AGROCREC No. 07-80, noviembre 1980.
- POMAREDA, C. y L. Avalos "Consideraciones sobre la Justificación y Posible Organización de un Programa de Seguro Agrocrediticio en Centro América". IICA-Proyecto de Seguro Agrocrediticio, AGROCREC No. 08-81, julio 1981.
- AVALOS, L. "Lineamientos Generales para la Organización y Puesta en Marcha de un Programa de Seguro Agrocrediticio". IICA-Proyecto de Seguro Agrocrediticio, AGROCREC No. 09-80, noviembre 1980.
- GUDGER, W.M. "Una Posible Estructura Administrativa y Financiera para iniciar el Seguro Agrícola en Chile". IICA-Proyecto de Seguro Agrocrediticio, AGROCREC No. 10-80, noviembre 1980.
- POMAREDA, C. "Portfolio Composition and Financial Performance of Agricultural Insurers: An International Comparative Analysis." AGROCREC No. 11-81 IICA-Proyecto de Seguro Agrocrediticio, junio 1981.
- GUDGER, W.M. "On Organizing Agricultural Insurance in Jamaica." IICA-Proyecto Seguro Agrocrediticio, AGROCREC No. 12-81 setiembre 1981.
- D. Forthcoming Publications
- CCAMA, F. y C. Pastor, "Efectos del Seguro Agrocrediticio el Crédito y la Asistencia técnica sobre la Producción de papa en Cochabamba, Bolivia".
- POMAREDA, C. "La Banca de Desarrollo Agropecuario y el Seguro Agrocrediticio".
- Note: Copies of the publications may be obtained from:
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