

QUARTERLY REPORT

FOR GRANT No. AID-LAC-IGR-1297



INTER AMERICAN INSTITUTE OF AGRICULTURAL SCIENCES OAS
CROP CREDIT INSURANCE PROJECT

QUARTERLY REPORT

FOR APRIL 1 - JUNE 30, 1981

FOR GRANT No. AID-LAC-IGR-1297



INSTITUTO INTERAMERICANO DE COOPERACION PARA LA AGRICULTURA
 INTER-AMERICAN INSTITUTE FOR COOPERATION ON AGRICULTURE
 INSTITUT INTERAMERICAIN DE COOPERATION POUR L'AGRICULTURE
 INSTITUTO INTERAMERICANO DE COOPERACAO PARA A AGRICULTURA

DIRECCION GENERAL

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SC/MZ-107
 August 4, 1981

Mr. Albert Brown
 Chief, LAC/DR/RD
 2242 NS - USAID
 Washington D. C. 20523
 U. S. A.

Re: USAID GRANT AID/LAC/IGR-1297

Dear Mr. Brown:

I am pleased to submit 10 copies in English of the Quarterly Report for the second calendar quarter of 1981 for the above cited grant. In addition to the general summary of the development of the project in all aspects, we have prepared a statistical section analyzing the growth and diversification of the Panamanian insurer and a financial analysis of the project's expenditures during the first semester of 1981 together with a estimate of our cash flow during the second semester.

As always, your comments on these reports are appreciated so as to help us prepare documents that are useful and informative.

Sincerely yours,

Lizardo de las Casas
 Director of Multizonal
 Projects, in charge

QUARTERLY REPORT FOR APRIL 1, 1981 - JUNE 30, 1981

FOR GRANT No. AID/LAC/IGR-1297

Pursuant to Section (1) of Attachment 1 of the above cited grant and Amendment 2 dated May 30, 1980, I have prepared the following Quarterly Report for the major activities of the Project during the Second calendar.

The second quarter of 1981 has been characterized by the normal development of the project's components. Panama has recently closed the 1980-1981 agricultural year. An analysis of the results of the year are included in this report. Ecuador has begun issuing its first policies for potatoes. Other products will soon be insured also. Bolivia has received approval to issue both livestock coverage and a group credit life policy. In addition, the Netherlands Reinsurance Group has offered very favorable reinsurance rates for the group credit life business. Our financial analysis continues to indicate that currently available resources for this year will be inadequate. An analysis is contained in the financial section of this report.

Should you wish any further information, please contact me.



Dr. William M. Gudger

Head, Crop Credit Insurance Division

PROJECT ACTIVITIES IN PANAMA:

Panama's agricultural insurer has recently closed the 1980-81 agricultural year. Overall, the portfolio administered by ISA performed satisfactorily. The portfolio grew from \$8.1 million to \$13.1 million between 1979-1980 and 1980-81 for an increase of 38% in total coverage written. See Graph N°1. The overall unloaded loss ratio was moderately high at 81%, as shown in Graph No.2 and Table 1.

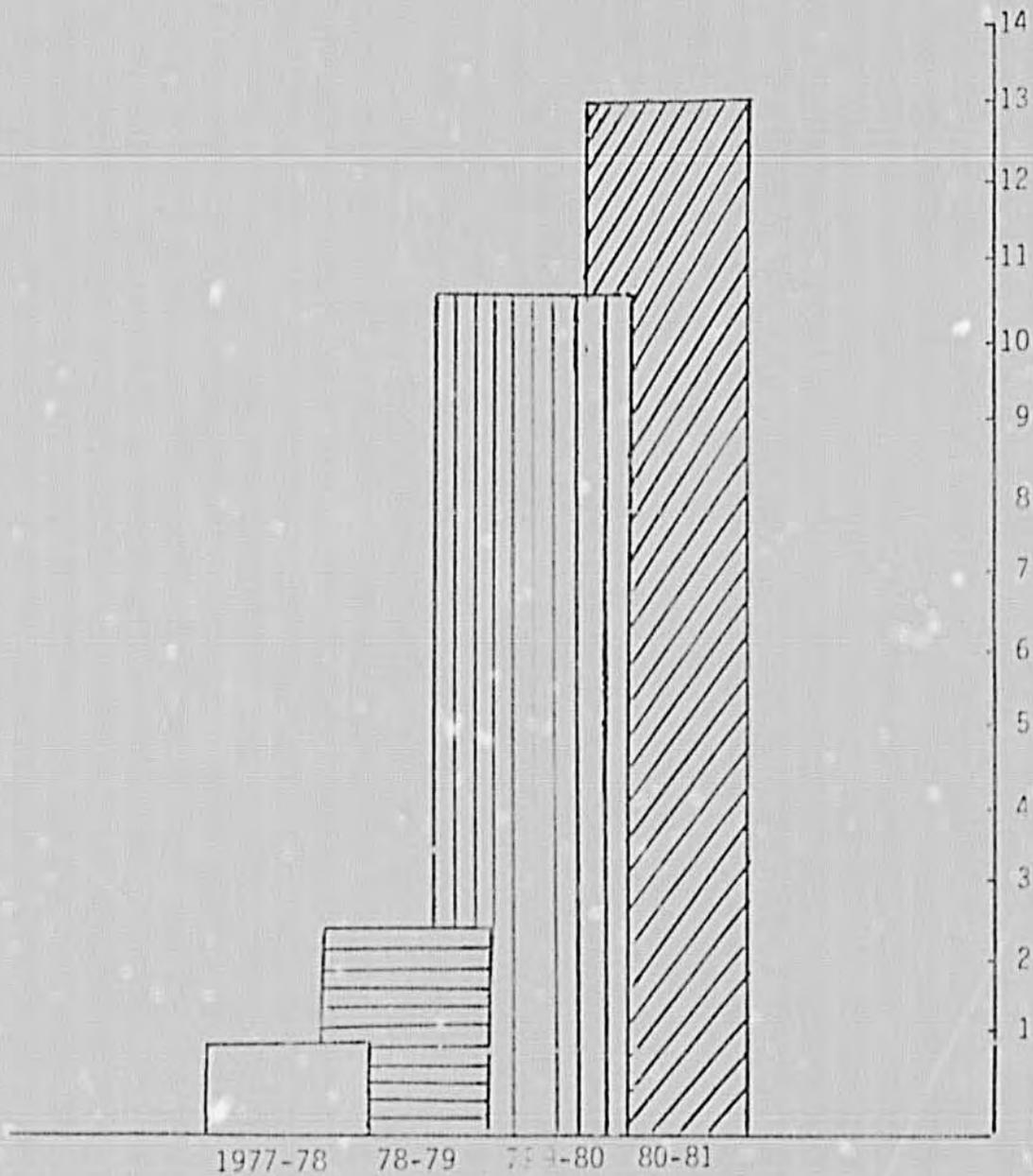
Despite the relatively rapid growth of the insurer, the project continues to serve the smallest farmers in the credit system. Table 2 shows that a full 1/3 of the farmers insured less than 3 hectares. Almost 3/4 insured less than 10 hectares. Even these figures underestimate small farmer participation as over 100 organized groups such as asentamientos, cooperativas and juntas have collective policies. Most of these groups have between 10 and 50 members who insure about 1/4 of the total hectares protected by ISA (See Table 3).

The source of the insured credit continues to be predominantly from the BDA. Almost 90% of the policies covered BDA loans. However, ISA is gradually diversifying to insure Banco de Fomento, Banco Nacional, and Cooperative loans as well as some self financing farmers as shown in Table 2.

We view these three developments, a rapidly growing portfolio, a modest loss ratio with a predominantly small farmer population and a diversification of insurance into the private financial markets as very positive achievement. They

PANAMA

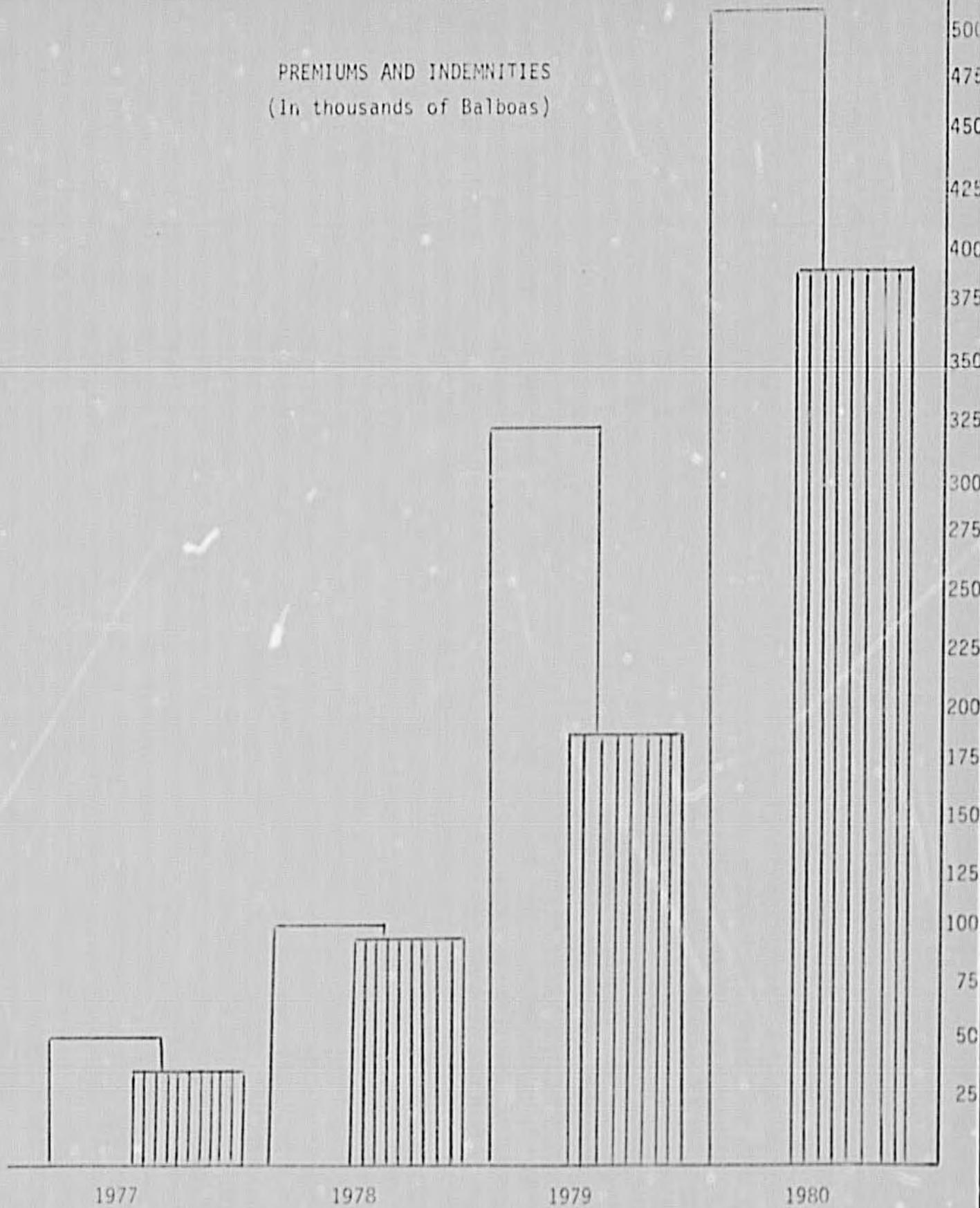
INSTITUTE OF AGRICULTURAL INSURANCE
 COVERAGE WRITTEN
 (In thousands of Balboas)



(In Balboas)				
Periods	1977-78	1978-79	1979-80	1980-81
TOTAL COVERAGE	1,129.579	2,636.498	8,131.592	13,113.708
AGRICULTURAL CATTLE	1,129.579	1,887.111	4,575.110	6,806.637
	-	748.987	3,555.882	6,307.071

Graph 2

PREMIUMS AND INDEMNITIES
(In thousands of Balboas)



Earned Premiums



Paid Indemnities

TABLE 1
 OPERATIONAL SUMMARY OF AGRICULTURAL INSURANCE
 BY AGRICULTURAL YEAR

CONCEPTS	1976-77	1977-78	1978-79	1979-80	1980-81
Coverage (B/.)	25,898	1 130,433	1,887,510	4,575,710	6,806,637
Insured Area (Hect.)	122	5,410	7,307	13,988	16,183
Issued Policy (#)	9	352	525	1,284	1,446
Indemnity Area(Hect.)	10	218	873	923	1,095
Policies indemnified	1	24	67	134	259
Paid Indemnities	1,588	17,783	93,730	130,451	290,013
Earned Premiums	1,165	58,723	103,741	269,630	356,261
Loss Ratio* (Percentage)	1.36	.30	.90	.48	.81

Source: Dirección Nacional de Seguro Agrícola

* This figure is the Unloaded Loss Ratio ($LP = \frac{\text{Indemnities}}{\text{Premium}}$) which excludes administrative and Loss Adjustment Costs.

TABLE 2

ISSUED INSURANCES OF RICE, MAIZE, SORGHUM, TOMATO AND BEANS BY TYPE OF FARMER AND SOURCE OF FINANCE.

YEAR 1980-81

AREA INSURED Hec.	TYPE OF FARMER						SOURCE OF FINANCE				
	Total	Independent	ORGANIZED				B.D.A.	B.F.	B.N.	CCOP.	Self-financed
			Asentamiento	Cooperatives	Juntas	Others					
Less of 3	480	466	---	---	13	1	440	---	4	28	8
3 - 5	322	307	2	---	13	---	269	3	8	39	3
6 - 10	272	262	3	1	5	1	251	2	2	11	6
11 - 20	226	211	10	---	5	---	199	---	2	21	4
21 - 30	63	51	12	---	---	---	58	---	---	3	2
31 - 40	25	19	5	---	1	---	23	---	---	2	---
41 - 50	16	11	3	1	---	1	16	---	---	---	---
51 - 75	26	14	8	---	4	---	25	---	---	---	1
76 - 100	6	2	3	---	1	---	5	---	1	---	---
Más de 100	11	3	4	2	---	2	10	---	1	---	---
TOTAL	1,447	1,346	50	4	42	5	1,296	5	18	104	21

Source: Dirección Nacional de Seguro Agrícola

TABLE 3

AREA INSURED BY TYPE OF FARMER (HECTT.)
YEAR 1980 - 1981

Provinces	Total	Individual Farmer	Organized Farmer
Chiriqui	5,603.25	3,513.75	2,089.50
Los Santos	5,668.00	5,395.00	273.0
Herrera	2,909.0	2,090.0	---
Cocle	1,043.60	447.48	596.12
Veraguas	1,147.0	195.0	952.0
Panama	631.5	233.5	398.0
TOTALES	16,183.35	11,874.73	4,308.62

Source: Dirección Nacional de Seguro Agrícola.

are further indicative of the feasibility of a self-financing insurer.

At present the program is still susceptible to adverse experience that could threaten its financial viability. However, as the program grows and cover larger values of credit, it will achieve a better spread of risk and begin to benefit from economies of scale. At present, ISA covers relatively modest percentages of the credit extended for insured options, excepting tobacco and sugarcane. (See Table 4).

The problem which must be successfully confronted if the program is to become a self-sustaining national program is that the present premium rates do not accurately reflect the real cost of the business, as mentioned in last quarter's report, we are developing a new set of premiums to reflect the true costs of each option. There are now available. Rice continues to subsidize most of the rest of the crops while many other crops are not paying an adequate premium. (See Table 5). Two factors are at work to produce these transfers and subsidies. Several components have had very adverse loss experiences such as corn in the Province of Panama; other components of the portfolio are expensive to service. A regionalization of the premium structures will enable ISA to remove some of the subsidies and to more accurately reflect the cost of the business. As can be seen from Table 6, the administrative costs per dollar of coverage vary widely. Again, corn in the Province of Panama is the most costly at \$2.50 per dollar of coverage while rice in Cocle costs only .34¢ per dollar. In other words, it is 140 times more costly administratively to protect the same dollar of investment in corn in Panama Province than to protect

TABLE 5

Nominal and Real Premium Rate per Crops and Province

1977-81

Crops and Province	Premium Rate 1980-81	Real Premium (Loss cost 1977-81 plus administrative cost)	Subsidy Percentage to farmer
<u>Rice</u>	0.05		
Chiriquí		0,0446	0.0
Los Santos		0,0161	0.0
Coclé		0,0487	0.0
Veraguas		0,0608	17.8
Panamá		0,05*	0.0
<u>Maize</u>	0.05		
Chiriquí		0,1233	59.44
Los Santos		0,0788	36.55
Herrera		0,1153	56.63
Coclé		0,0742	32.61
Panamá		1,0437	95.20
<u>Sorghum</u>	0.05		
Chiriquí		0,1489	55.42
Los Santos		0,1049	52.33
Herrera		0,0934	46.47
Coclé		0,1302	61.60
Panamá		0,0652	23.31
<u>Beans</u>	0.05		
Chiriquí		0,2158	76.83
<u>Tomato</u>	0.06		
Los Santos		0,0753	20.32
Herrera		0,1332	54.95
Coclé		0,1426	57.92
Veraguas		0,7954	92.45

* Data for only one year.

TABLE 4

AREA FINANCED BY THE BDA
COVERED BY THE ISA 1980 -81

Crops	Area Financed	Area Insured	Percentage Insured
Rice	22,577	7,700	34.1
Maize	9,386	3,696	39.4
Sorghum	5,408	3,838	71.0
Beans	670	89	13.3
Tomato	876	860	98.2

TABLE 6

ADMINISTRATIVE COST PER COVERAGE DOLLAR 1980 - 81

	Chiriqui	Los Santos	Herrera	Cocle	Veraguas	Panama
Rice	0.0315	0.0007	-	0.0033	0.0335	0.0499
Maize	0.0802	0.0494	0.0537	0.0543	-	0.4253
Sorghum	0.0973	0.0268	0.0295	0.0175	-	0.0620
Beans	0.1168	-	-	-	-	-
Tomato	-	0.0354	0.0391	0.0657	0.3236	-
Feeder Stock	0.0511	0.0526	0.0480	0.0675	0.0488	0.0333
Gen Bulls	0.0089	0.0085	0.0154	0.0175	0.0122	0.0096
Breeding Stock	0.0350	0.03117	0.0260	0.0375	0.0316	0.0225

rice in Coole. This vast difference needs to be closed both to reflect the true risk cost of production and to protect the insurer and its clientele who must pay the cost through transfers from less risky crops.

The livestock portfolio has shown the same rapid growth as the agricultural portfolio. Over the last year, the total premium written increased by more than 40% to a total of \$6.3 million. (See Table 7). The unloaded loss ratio decreased to 69% due to two factors: a diversification of the portfolio and an increasing professionalization of the staff. Table 8 indicates that the premium in the livestock portfolio also require some adjustments to compensate for the loss experience and prevent subsidization of some farmers by others.

From these calculations of the real premium required to cover the loss cost and administrative experience, several very tentative conclusions can be drawn. First, premium rates can be expected to vary widely. The three grains for which several years of loss experience is available show premiums ranging from a mere 1% for rice in Los Santos to almost 15% for sorghum in Chiriqui. The range of premium required to cover livestock losses and administration costs is slightly smaller, ranging 1.5% to almost 8%. Second, not all farmers nor options are insurable if the farmer has to bear the real cost of the protection. If these high risk options are to be protected, the government will have to bear part of the premium cost. It is most unlikely that a farmer could pay 15% over and above interest cost and show a profit. However, by calculating real costs, ISA can permit the government to see which options it is subsidizing at what rates and which options are transferring resources to others. Third, while the range

TABLE 7
 OPERATIONAL SUMMARY OF CATTLE INSURANCE BY PERIODS

CONCEPTS	1978-79	1979-80	1980-81
COVERAGE (B/.)	748.987	3,555,862	6,307,071
INSURED HEADS	3,392	11,677	18,969
POLICIES ISSUED (#)	284	830	1,276
PAID INDEMNITIES (B/.)	8,731	64,191	112,130
EARNED PREMIUMS (B/.)	10,774	61,937	163,318
Loss Ratio*	.87	1.04	.69

NOTE: The periods are from May to April.

Source: Dirección Nacional de Finanzas

* This figure is an approximation ($LR = \frac{\text{Indemnities}}{\text{Premium}}$) as the unearned premium has not been removed nor are administration and loss adjustment costs included.

TABLE 8

Nominal and Real Premium Rate for Cattle activities by Province
1978-81

Activity and Province	Average Rate* Premium 1980-81	Real Premium (Loss cost 1978-81 plus administrative cost)	Subsidy Percentage to the farmer
<u>Feeder Stock</u>			
Chiriqui	0.0268	0.0639	58.06
Los Santos	0.0343	0.0677	49.33
Herrera	0.0193	0.0778	75.19
Corlé	0.0697	0.1135	38.59
Veraguas	0.0214	0.0696	69.25
Panama	0.0223	0.0447	50.11
<u>Semen bulls</u>			
Chiriqui	0.0266	0.0340	21.76
Los Santos	0.0273	0.0220	0.0
Herrera	0.0287	0.0154	0.0
Cocle	0.0261	0.0408	36.02
Veraguas	0.0498	0.0409	0.0
Panama	0.0360	0.0409	11.98
<u>Breeding Stock</u>			
Chiriqui	0.0235	0.0558	57.88
Los Santos	0.0202	0.0429	52.91
Herrera	0.0289	0.0409	29.33
Cocle	0.0250	0.0577	56.15
Veraguas	0.0280	0.0495	56.56
Panama	0.0215	0.0328	34.45

* Average Rate Premium 1980 - 81 = $\frac{\text{Earned Premiums 1980 - 81}}{\text{Coverage}}$

of premium required to cover loss costs is likely to remain about the same (for example, the highest about 10 times the lowest on crops), the absolute numbers should diminish significantly as the program grows and achieve economies of scale both in the central office and in the field, thus reducing the administrative costs.

PROJECT ACTIVITIES IN ECUADOR

On the 4th of June, the Superintendent of Insurance approved the issuance of agricultural insurance by CONASA. Following of the issuance of Superintendent's decree, CONASA began to issue potato insurance in the north of Ecuador near Tulcan. The sale of policies is currently underway and at this writing no data is available. Initial estimates, however, are that the total number of insured will be quite small, perhaps of the magnitude of 50-60 policies. However, we believe that for an initial test this number is adequate. It will permit an intense supervision and at the same time is adequate to provide a trial run for the administrative and financial systems.

The next crop to be insured will be coastal rice near Guayaquil in the Daule area. Again, a small pilot project is planned as the initial test. The first policies should be issued in late June or early July. At present however, there are some severe marketing problems in rice which must be solved before it is technically feasible to offer the coverage. Although market risk is not covered, it would be unrealistic to offer coverage for a crop with high price variability and a strong likelihood of producing a loss.

At present, documentation for the livestock insurance and the farmer credit life insurance programs are in the regulatory process. CONASA is legally permitted to operate both lines and the approval to begin should be forthcoming during the next quarter.

As the insurance programs are actually beginning, IICA must initiate the research effort. We have attempted to cover both Ecuador and Bolivia with the present staff of two researchers. It is, simply put, infeasible to do an adequate job with the present human resources. We will contract a researcher stationed in Quito for both Ecuador and Bolivia. The name of that person will soon be submitted to USAID.

PROJECT ACTIVITIES IN BOLIVIA

ASBA, the Bolivian insurer, closed its first cycle in a very satisfactory manner. The small group of insureds in the Cochabamba area suffered no losses. Although, early hail caused damage to potato plants, they were able to recover due to the technology utilized as a prerequisite of insurance. In fact, the insured's yields exceed the yields of uninsureds by about 40%. The pilot project has also produced a substantial demand for credit, insurance, and the technology package, so substantial in fact that care must be taken not to produce an unmarketable surplus of potatoes in the region.

The Superintendent of Insurance has approved the operation of the farmers' credit life insurance program. ASBA has also received a reinsurance proposal from the Netherlands Reinsurance Group for a very attractive quota

share and excess of loss contract. The final terms of the operation of the credit life insurance with BAB are being negotiated, notwithstanding that one of the most important branches, Cochabamba, is occupied by the military. USAID has suspended P.L.480 disbursements to BAB. As a result, we are uncertain that ASBA will be able to insure BAB credit.

The livestock insurance authorization is in the Superintendency and approval is expected shortly. ASBA plans to insure two herds, one of 50 Brown Swiss imported from a acclimatization station in Peru and one of 3,000 head air freighted from Uruguay. The value of the herd is estimated at \$2,000,000 U.S.

As the forthcoming quarter is the Bolivian winter, ASBA will be engaged principally in evaluation of the first cycle and selection of risk for the forthcoming cycle. We expect to be able to expand considerably and operate in two zones, in addition to including two new crops, livestock and a credit life program. As always, the development of ASBA is heavily dependent upon BAB and P.L.480. At present, the prospects for an orderly insurance operation remains highly exposed to developments beyond its control.

FINANCIAL ANALYSIS

Budgeted and Actual Expenses for First Semester 1981

The total budget for all elements of the project for calendar year 1981 was set at \$1,314,258. Of this amount \$747,696 was budgeted and obligated to the insurers as subgrants, while \$566,562 was the estimated cost of the IICA project. The breakdown of these costs is found in Section A of Exhibit 1. (This cost estimate is very closed to the estimate contained in Exhibit No.2 of our October, 1980 presentation to AID).

EXHIBIT N° 1
GRANT IICA/AID/LAC - IGR - 1297
BUDGET STATEMENT 1ST SEMESTER 1981
(US DOLLARS)

	SUBTOTAL	TOTAL
A. <u>APPROVED BUDGET FOR YEAR 1981</u>		
A.1 Sub-grants	193,525	
ASBA	246,171	
CONASA	<u>308,000</u>	747,696
A.2 IICA Project		<u>566,562</u>
Total Budget		1,314,258
B. <u>ACTUAL EXPENSES INCURRED</u> <u>1ST SEMESTER 1981</u>		
B.1 Sub-grants		
ISA	84,082	
ASBA	90,543	
CONASA	<u>101,328</u>	275,953
B.2 IICA Project		<u>198,576</u>
Total Expenses		474,529
C. <u>BUDGET AVAILABILITY FOR</u> <u>2ND SEMESTER 1981</u>		
C.1 Sub-grants		
ISA	109,443	
ASBA	155,628	
CONASA	<u>206,672</u>	471,743
C.2 IICA Project		<u>367,986</u>
Total Budget		839,729

Anticipated Expenses for Second Semester 1981

Exhibit 2 displays our cash budget for the second semester. As of June 30, we had \$180,000 on hand from a recent \$200,000 drawdown. To date, \$2,489,000 has been authorized of which we have drawn down \$1,975,000 to finance project activities cash on hand and funds in the Federal Reserve total \$694,000.

In Section B of Exhibit 2, we have displayed an estimation of the expenses incurred in the first quarter which have not yet been charged against the grant. These charges are based upon the reimbursement requests currently being processed by the project and the June requests which have been received by not yet processed, as well as an estimation of IICA expenses not posted to the June books. The amount available for drawdown against the currently authorized level is \$492,455.

We have revised our Second Semester cash budget to reflect our First Semester's expenses and the actions taken to remain within the authorized budget. At present, we estimate that we will disburse \$355,300 to the insurers. This higher second semester estimate is due to the full operationalization of the Ecuadorian insurer and the beginning of new agricultural cycles in both Panama and Bolivia. The IICA project expenses are estimated at \$250,000, slightly higher than the first semester. Part of the added costs arise from two of the project's staff who have returned from leave and will incur the usual travel and other costs. The delayed but presently programmed hiring of the researcher will also add to costs. An additional expense of \$50,000 is estimated for the Dominican Republic until mission funds come on stream sometime in December or January, 1982.

EXHIBIT Nº 2
GRANT IICA/AID/LAC - IGR - 1297
CASH BUDGET 2ND SEMESTER 1981
(US DOLLARS)

	SUBTOTAL	TOTAL
A. FUNDS AVAILABLE JUNE 30		
A.1 Cash on hand - IICA		180,000
A.2 Federal Reserve Bank		
Authorized to date	2,489,000	
less: disbursements	<u>1,975,000</u>	<u>514,000</u>
Sub total		694,000
A.3 Estimation of incurred but not disimbursed 1st quarter expenses sub-grants IICA Project		-181,545 - 20,000
Total funds available June 30		<u>492,455</u>
B. BUDGETED EXPENSES FOR 2ND SEMESTER		
B.1 Sub-grants		
ISA	109,500	
ASBA	122,600	
CONASA	<u>123,200</u>	<u>355,300</u>
B.2 IICA Project		
Present Project	250,000	
Dominican Republic	50,000	
IICA Overhead	<u>39,500</u>	<u>339,500</u>
Total Budgeted Expenses		<u>694,800</u>
C. CASH FLOW SHORT FALL (A-B)		<u>202,345</u>
D. ESTIMATION OF DECEMBER EXPENSES TO BE POSTED JANUARY 1982		<u>60,000</u>
E. ADDITIONAL FUNDS REQUIRED		<u>142,345</u>

These estimated expenses for Second Semester total \$694,800, of which \$492,455 is available. This produces an estimated \$202,343 shortfall on December 30, 1981. We estimate that this amount will be reduced by about \$60,000 by expenses incurred in December but not posted until January 1982. Our estimated shortfall for Calendar 1981 is \$142,340 a figure close to our first quarter estimate of \$144,000 (with the cost of the Dominican Republic excluded).

From this analysis, several points should be given particular attention. First, and most important, is that the costs of a fully operational project can be expected to be about \$1.2 million per year plus or minus about 10% for contingencies unforeseeable. Costs increases at least as high as the inflation rates can be expected. This is particularly true as all three insurers are fully operational. Most of this is fixed cost and as such is relatively immune to reduction. Second, the presently authorized level will finance the project until the end of November or perhaps into December of this year if further cost reductions can be realized. Third, the project will finish 1981 with almost no cash on hand.

In the past, modifications of the Grant to increase the amount obligated have been received in August. We assume that this practice will be continued and have therefore prepared an estimate of the project's First Semester 1982 expenses. Given a one month lag in posting the books, the amount shown in Exhibit 3 should carry the project until July 1982.

As our operations develop during the second semester, we will continue our efforts to estimate the required levels of expenditures. These will be included these estimates in future Quarterly Reports and other documents.

EXHIBIT N° 3
GRANT IICA/AID/LAC - IGR - 1297
BUDGET FOR THE 1ST SEMESTER 1982

A. SUB-GRANTS

ISA	100,000
ASBA	135,000
CONASA	<u>141,000</u>
Total Sub-Grants	376,000

B. IICA Project

Actual Project	285,400
Dominican Republic	105,000
IICA Overhead	<u>43,600</u>
Total IICA Project	<u>434,000</u>

C. TOTAL BUDGET FOR 1ST SEMESTER 810,000

RESEARCH ACTIVITIES:

Our research activities have moved ahead steadily throughout the second quarter. Research upon the impact of insurance upon farmer and the agricultural sector is a complex task, as the phenomena under study is a intricate part of the systems of agricultural production in the three countries. We have opted to try to piece together the puzzle in a methodical manner with carefully designed an rigorously controlled testing.

The first results of this work is now becoming available and can be reported in tentative form. It should be remembered that these results are partial, as they are from only one country, one year and/or one crop. However, we believe them interesting enough to be cited.

Farmers and Insurance

The project's linear programming model is designed to estimate the farmer's demand for insurance. Although the schemes are obligatory, demand can serve as a dummy variable to estimate the farmer's "need" for the insurance for the various crops produced on his farm and estimate the degree of receptivity of the farmer to its introduction. Our first runs of the model indicate a very interesting pattern of demand. Insurance is not in demand when traditional farming methods, including diversification of plantings, are used. It is, however, in demand when farmers move to production characterized by a higher degree of capital intensity (and concomitantly a greater financial risk), and more sophisticated technology. Initial results seems to indicate that insurance is most useful in stimulating those

farmers with an adequate resource base for specialized production to change to more productive technologies. Likewise, farmers who have already made the transition to more capital intense agriculture tend to demand insurance as a risk management tool. Insurance seems less in demand when farmers continue to use traditional technology. In term of costs and benefits, one would expect much more favorable ratios when insurance is offered to groups attempting to move toward small scale commercial production but are hindered by an inability to bear the financial risk.

A concrete example of this phenomena is the results of Panamanian industrial tomato producers. These are principally small farmers who are able to plant 1 or 2 hectares of tomatoes during the dry season due to the presence of a river for irrigation. They produce on contract for a nearby plant and thus have their prices fixed. The plant also supplies very good technical assistance and thereby greatly reduces disease and pest losses as well as those caused by less than adequate technology usage.

The first year insurance was offered, only 45% of the farmers took the policy which carried a 7% premium. Our survey was able to take advantage of this nearly ideal laboratory condition to administer questionnaires to both groups. The effects of natural phenomena was the same. Their yields were very similar. In fact, the only significant difference was that the insured's income was about 15% higher than the uninsured's due to the net indemnities (total indemnities minus premium) derived from their policies.

Unfortunately, the success of insurance has destroyed our nearly ideal laboratory. In the 1980/81 cycle, 98% of the producers opted for the insurance. The results of this nearly universal acceptance of insurance produced loss ratios ranging from 4% in Los Santos Province to 76% Veraguas Province, indicating that the geographical risk spreading function of insurance is working to produce results similar to those of the 1979/80 cycle reported above. Further surveys will be carried out to quantify the results of the cycle.

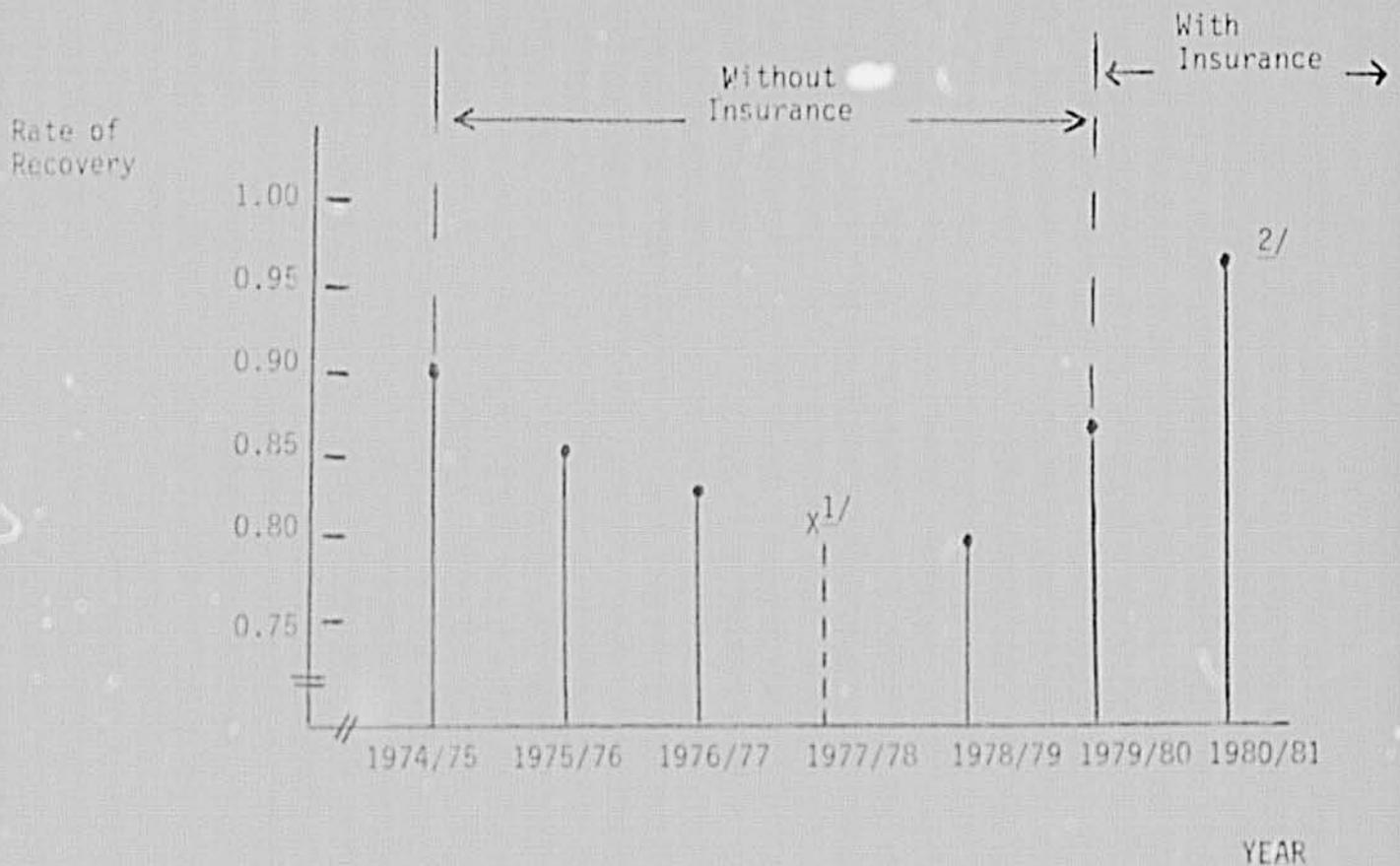
The Credit System and Insurance

The second component of the overall production system we are studying is the rural credit system, specifically the formal lending institutions. We are specifically interested in changes in the structure and performance of the portfolio of the lender following the partial introduction of insurance. The collection and organization of portfolio data is very time consuming and costly. However, some revealing tentative results are available. In Graph No.3, we can see clearly that Panama's Banco de Desarrollo Agropecuario (BDA) was experiencing a declining rate of recovery in its tomato portfolio from 1974 to 1979. The introduction of insurance reversed that tendency and now the BDA enjoys over a 95% loan recovery rate, an increase of 15% in two years.

We are presently trying to estimate the additional savings that insurance produced for the bank by relieving them of administrative costs, the cost of carrying overdue loans, and the cost of pursuing debtors so that we can compare them to the insurer's administrative costs and derive an estimate of the net gain for the agricultural credit system.

Graph #3

PANAMA: BDA'S TOMATO PORTFOLIO EXPERIENCE



1/ Data not available.

2/ Preliminary Data

SOURCE: C. Pomareda y T. Fuentes. [El Efecto del Seguro Agrocrediticio sobre la Producción y Financiamiento de Tomate Industrial en Panamá. IICA AGROCED mayo 1981 (borrador)].

Developing financially viable insurers

One of the key tasks of the entire project is to establish and help operate financially viable insurers. It is not obvious a priori that the application of standard insurance practices and technique will yield satisfactory results in the field of agricultural insurance. In fact, our early research results suggest that the normal distribution theory (Poisson curves, for example) upon which most actuarial calculations are based does not seem to hold in the case of Panama. An analysis of 4,000 insurance operations suggest that an agricultural insurer may have to develop an entirely different theory of the incidence and severity of loss to permit the calculation of an adequate premium.

This conclusion is reinforced by a recently completed portfolio analysis of four agricultural insurers. The U.S. (since 1948), Israel (since 1967), Costa Rica (since 1970) and Panama (since 1977) all show the same phenomena in their portfolios. The determining factors for the net variation of income for an insurer are: 1. the degree of diversification 2. the variance of the net incomes of each alternative and 3. the correlations between the net incomes of each alternative in the portfolio.

These results in turn suggest that the usual actuarial calculus based upon the variation of net incomes by crop are inadequate for overall portfolio structuring as it ignores the effects (positive and negative) of covariance among the options. The significance of this finding for a non-profit, public service insurer is that premium levels may be set lower than a standard actuarial calculation

would indicate if the covariation of the alternatives within the portfolio is strongly negative. There is, in other words, the opportunity to develop a compensatory cash flow model in which negatively correlated options are selected to offset each other thus enabling the insurer to price its product on the basis of the portfolios performance.

Another implication that logically arises from this study is that from the outset insurers must seek diversification. In this process of seeking spread risk, the traditional consideration of geography, crop, and microclimate are less important than are strong negative correlations in the yields of the insured crops.

This model is providing the functional base for selecting a financially viable insurance portfolio and for planning sound safe growth. It is also of vital importance in negotiation with banks, who quite naturally want to pass their riskiest customers to the insurer. With the model, the insurer (ISA in this case) can estimate the required premium, the amount of each type of client that can be incorporated, and the overall effect of the options on the portfolio. An insurer can thus accept some risky clients if their yield variation have a strong negative correlation with the other elements in the portfolio.