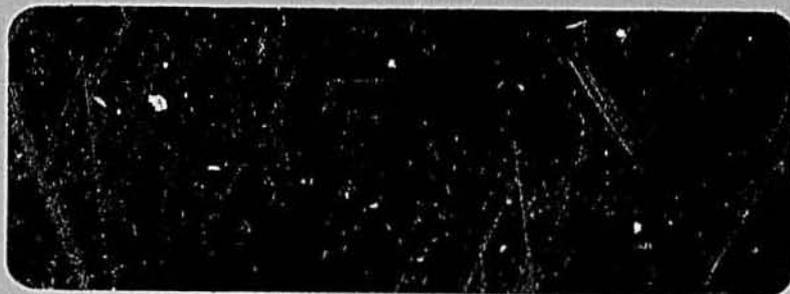


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AID/LAC-IGR-1297

MEMORANDUM

October 30, 1981

TO : LAC/DR/RD, Mr. Albert L. Brown

FROM : LAC/DR/RD, Nelson Maurice *N. Maurice*

SUBJECT: Periodic report: Status of the Crop Credit Insurance Project, No. 598-0579

I. Status of the Insurers

The condition of the three insurers principally associated with the program is excellent. Pages 1 to 16 of the report for the second quarter of 1981, submitted by IICA and attached here as Annex A, make excellent reading. The Panamanian program continues solid; ASBA in Bolivia has moved into its second crop season; and, CONASA in Ecuador, has issued its first 50 policies. Fifty insureds, by the way, is a very proper sample size for the first essay into this business.

The most impressive fact that I want to report about these insureds is a subjective one. Management of the insurers and the technical staff pulled together by Mike Gudger at IICA are agile, energetic and extremely dedicated to their tasks. There has been a great deal of initiative shown and some surprising achievement realized. In Bolivia, for example, the insurer will be adding one or two new crops, a livestock program, a life insurance program, and is well advanced in the process of having the government spin them off as a private sector insurer. (The need for this will be discussed below, in section V.) I discussed the need for this organizational change with ASBA and its advisors once in May. They have moved on their own, forcefully and well.

Also, because of the shortage of ag credit in Bolivia, ASBA has a shortage of loans to insure. It has been, therefore, extremely aggressive in finding and matching funds and lenders so that small farmer loans can continue. This is unique institutional behavior in Bolivia today.

In ~~short~~, we now have three insurers that are behaving as we envisioned when the project was approved. They provide an excellent laboratory for refining what we know about doing this kind of insurance and for measuring the impact (i.e. social utility) of this instrument.

There is a fourth program associated with our project, this is ANACA in Venezuela. AID funds are not being used to support it but the AID-created crop insurance expertise at IICA has promoted this one on its own. Unfortunately, ANACA, as it is now constituted, has little chance of being successful as defined by any meaningful criteria. The program has been lavishly funded by the GOV and the funds have been given directly to it. With the other

insurers, the funds were channeled through the technical assistance organization (IICA), which gave them quite a bit of leverage on the insurers' new management. In this case, ANACA has tended to ignore the technical advice provided by IICA, advice which usually spoke of restraint and more careful structuring of the insurer and use of personnel and other resources.

An important lesson can be learned here. This is, that channeling financial assistance through the technical assistance source will increase the probability of the TA being well used.

## II. Status of the Research

A conference on crop insurance research is being scheduled for February, 1982. The conference will be sponsored by the crop insurance program of IICA and IFPRI (International Food Policy Research Institute). It will review progress to date and recommend questions and methodology for further investigations. The conference will primarily involve agricultural econometricians.

An interesting aspect of the research being conducted by this project is that one set methodology is not being followed. Rather, a provisional methodology was established and data collected. Once that data was analyzed, the need for modifications in the methodology became apparent and were introduced. This process should continue to the end of the project.

The purpose of this research is double. First, there is an impact or benefit/cost goal where we are concerned to know if the size of the benefits are great enough to warrant AID's, the host governments and even the farmers' investments. This aspect, once one allows for its extreme difficultness, is going quite well.

The second face to the research is what might be called operations research. That is, the generation of information that can be used to improve the management of the insurers, per se. On this front, there has been considerable progress, but it has been uneven. The unproductive efforts have resulted, in my opinion, from a tendency for different groups of professionals to work in isolation. The economists have not consulted with the insurance professionals, nor have the insurance personnel offered to work with the economists. This is due to several factors; the natural, psychological preference of people to deal with similarly trained professionals; the widely scattered stationing of our personnel; and the very limited number of people in the program.

In any case, in order to assure high quality analysis and prescription, IICA will have to make special efforts to increase interdisciplinary cooperation. I have discussed this with project management.

Please see pages 22 to 25 of the last IICA Quarterly Report, attached here as Annex B, for additional insight into the research activities.

### III. Crop Insurance Developments in Other Countries

We expect to see an insurer start soon in the Dominican Republic. The authorization for our regional project has been amended to permit our working there. The Mission has agreed to provide grant financing for the technical assistance and we are now preparing another amendment to the regional project to incorporate this increase in funding.

On the GODR side, the groundwork for the insurer has been completed and enabling legislation for the insurer is awaiting the President's signature. This, in turn, seems to be dependent on a determination of what level and schedule of funding will be provided to the insurer. This is actively being negotiated and should be reached soon.

We have been striving for some time now to establish this insurer as a private sector enterprise and have been reasonably successful. The insurer will be a mixed corporation, but its charter will permit the private sector to dominate. The bylaws of the insurer will be written after it is chartered. It will be crucial that we provide qualified technical assistance at that point to assure the position of the private sector.

We have recently begun conversations with both the USAID and the Government of Honduras. Initial reactions were encouraging, although some skepticism, which is quite healthy and reasonable for a new project such as this, has been expressed. Crop Insurance may be included as a shelf project in the present PL 480 programming exercise.

A comprehensive review of the agricultural credit system in Honduras should be completed shortly. The decision to continue promoting crop insurance or not will be taken in the context of this larger question -- i.e. How to improve the agricultural credit system?

In Colombia, we have provided some assistance to private companies and the government. There is presently a bill before the Colombian Congress which would create a government controlled insurer which the private companies would be forced to reinsure. This situation would be highly unstable. There would be no reason for the (politically controlled) insurer to avoid paying unnecessary losses as long as they could "milk" the reinsurers.

IICA is sponsoring a conference, to be held in November, in Bogata, to provide some basic education about crop insurance and to turn

the present situation around. The moment is particularly ripe to get a good insurer started. Colombia, also, is a particularly attractive place to work because of the size, degree of development, and general affluence of the country. Any program run here will be much more visible than in any of the other countries where we now operate.

Apparently, as a result of seeds sewn as early as four years ago by myself and more recently by the IICA people, the Government of Paraguay has recently become interested in crop insurance. Based on my earlier visits there, I believe that there is a good chance to develop an excellent program. A two-man IICA team will be there in early November to produce an initial feasibility study and design. I will overlap with that team for 2-3 days.

#### IV. Technical Assistance Capacity

One of the primary goals of this project is the creation of a crop insurance technical assistance capacity which would be available to work in other countries and regions after the end of this project. Good people have been found and trained, and they now form the nucleus of that long lived TA capacity.

Unfortunately, the present strategy of working within IICA is unlikely to produce the desired results. This is because of the following factors:

- A. Present employees are likely to leave the project because of salary problems.
- B. Dual managerial control impedes the effectiveness of the technicians.
- C. IICA personnel policies are designed to select agriculturalists and it is unwilling/unable to adjust to allow the hiring of insurance professionals.

Efforts to focus IICA's attention on the seriousness of these problems have been unsuccessful. An attempt will be made again in a few months. Revision and extension of the project (see section VI, below) will be held in abeyance until that time to permit AID to change the strategy and channels for creating the technical assistance institution, if this proves to be unavoidably necessary.

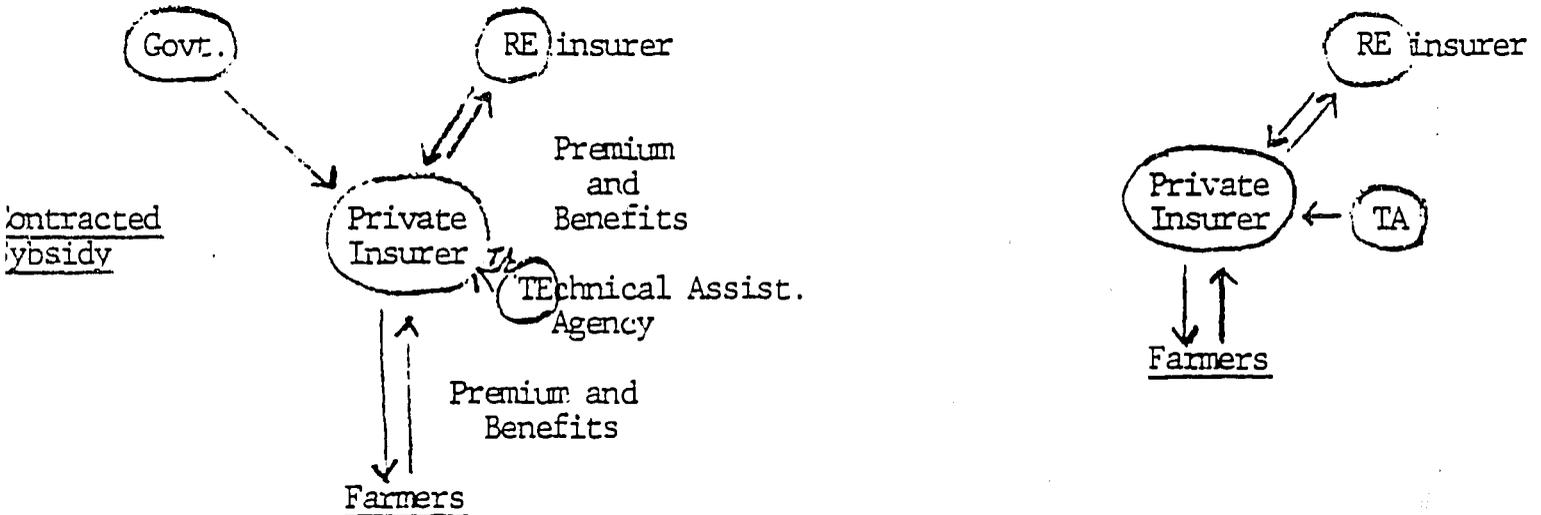
#### V. Lessons Learned

This project has an overt research component, some results of which have already been discussed. There is also an implicit research component: it is the entirety of the project. This is due to the fact that crop credit insurance is new (begun by this project) and that we are busy learning or discovering how it should be done.

Near the end of 1980, we began to understand the implications and interrelations of the insurer's structure, the risks insured, and the financing of the insurer. We now believe that we know how to build financially viable and financially self-sufficient crop credit insurers. (The difference between financially self-sufficient and viable is that while both are capable of continuing in existence indefinitely, and functioning effectively, the financially viable organization require continued subsidies.) We have now made successful connections with the international commercial reinsurers and, in effect, have created an integrated financial structure which can withstand very large losses.

A. Financially Viable Insurance System

B. Financially Self-Sufficient Insurance System



Notice that the two systems are identical except that one includes a circle labeled "Government" and an arrow with the underlined term, "Contracted Subsidy." This term is key; here is why.

In the all-risk crop insurance case we protect against broad (or catastrophic) hazards such as draught and flood. If one farmer suffers, many others will be in the same situation. Note that this is not the case with most other insurances -- life, auto, fire, etc. where if one insured loses, others do not necessarily also suffer losses.

What can happen when all of these farmers lose their crops is that they put pressure on the government for relief. If the government owns an insurer it may (and frequently does) order it to pay the losses. In the case of wealthy nations, this is not a problem. For poor countries, however, it is a different story. The funds to pay the losses must come from somewhere.

If a reinsurance treaty is in place, the temptation will be to "milk" the reinsurer. As soon as the reinsurer perceives this to be the case, it will get off the risk. The insurer will cease being an integrated financial structure and will depend heavily upon public funds to pay for losses. It will become just another economically irritational subsidy channel which will steer more and more resources to the politically powerful and away from poor and average farmers.

If the insurer can be organized as a private company (e.g. - farmer owned mutual), there can be a coincidence of the entrepreneurial or private profit motive and the social welfare goal. The interposition of the private insurer, which does not want to pay losses unnecessarily, in the system diagram provides protection or insulation for the reinsurer, and quite surprisingly, for governments. Reinsurers can stay on the risk and the system can again handle large losses, that is, it again be viable.

Key elements here are that the insurer's management be private sector controlled, that the pursuit of private (either individual or cooperative) profit can be made to coincide with the pursuit of the social welfare goal, and that government subsidies to the system must be contracted, specific and limited. The subsidies cannot be simple, open-ended guarantees to pay excess losses since this allows politics to get back into the decision making.

We now see viable insurance - type responses in three different situations.

1. The privately-managed insurance company, with or without carefully controlled government support, is viable and dominates in all situations.
2. If the local situation will not permit a privately-managed insurer, then the classical model of the "insurer" as a government agency is viable if and only if the country is very wealthy (U.S., Mexico, Venezuela, Japan, Sweden, Canada). Note that we said only that the system is viable. In terms of economic benefits and costs, the private model will dominate.
3. Where private management is not possible and the country is not wealthy, then any disaster relief type program would be preferred over a public insurer. A public insurer of catastrophic risks would be about as effective and cost efficient at its job as most agricultural development banks are at theirs.

Since this spring, we have been concentrating on moving our insurers to the private sector.

This relation between reinsurance, management control, and the type of risks we insure are further developed in the draft paper attached here as Annex C.

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TABLE 3

AREA INSURED BY TYPE OF FARMER (HECT.  
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 undercut its financial viability. However, as the programs grows and cover larger volumes of credit, it will achieve a better spread of risk and begin to benefit from economics of scale. At present, ISA covers relatively modest percentages of the credit extended for insured options, excepting tomatoes and sorghum. (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 42.5¢ 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	66.42
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	0.0087	-	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
Semen 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 Cocle. 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/.)	10,074	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
Coclé	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>			
Chirique	0.0235	0.0558	57.88
Los Santos	0.0202	0.0429	52.91
Herrera	0.0289	0.0409	29.33
Cocle	0.0253	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 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.

## 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

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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 imcome 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.

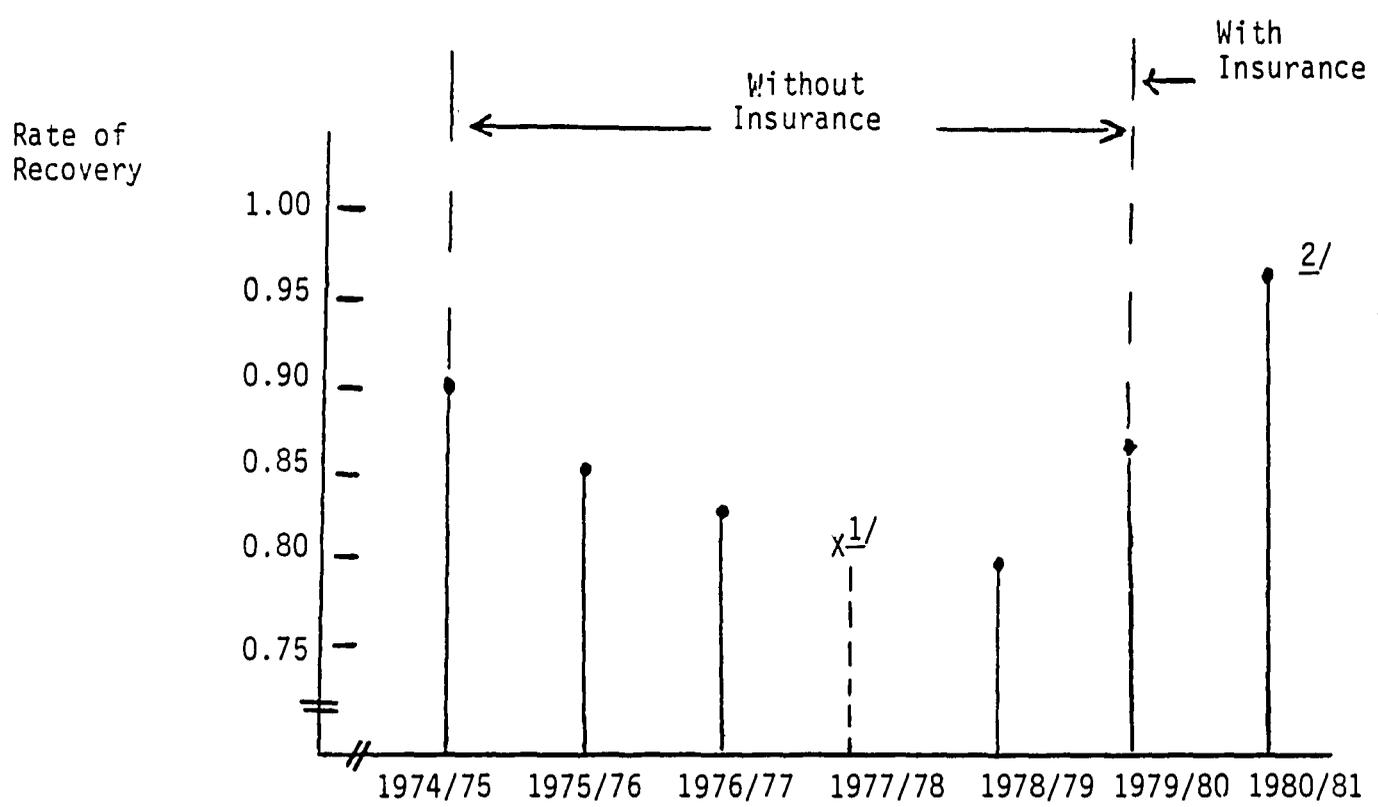
#### The Credit System and Insurance

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



VEAD

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)].

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ANNEX C

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**DRAFT**

REINSURANCE AND  
CROP INSURANCE STRUCTURAL FACTORS

**DRAI**

Nelson Maurice  
Coordinator for Overseas Programs  
Federal Crop Insurance Corporation  
U.S. Department of Agriculture  
and  
Crop Insurance Advisor  
Latin American and Caribbean Bureau  
U.S. Agency for International Development

Opinions expressed are solely the author's and do not necessarily reflect those of the Federal Crop Insurance Corporation, the U.S. Agency for International Development, nor the United States Government.

C

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3

## I. INTRODUCTION

In October 1980, David Gilboa and I reviewed the advisability of FAO becoming involved in crop reinsurance as had been requested by its previous General Assembly. Our views were presented in a brief paper entitled Reinsurance and Comprehensive Crop Insurance Programs. Since then, work supported by the Agency for International Development ~~(AID)~~ and implemented by the Interamerican Institute for Agricultural Cooperation ~~(IICA)~~ in Latin America as well as the continuing review of programs and issues in other parts of the world has shed new light on the design of crop insurers and has made it evident that a supplement to the earlier paper would be useful.

The basic premise of this paper will be that the availability of crop reinsurance is limited primarily by structural factors of the crop insurers themselves and that these can be managed with proper planning. Central to this premise is our belief, supported by early experience in Latin America as well as by the mature programs in Mauritius and Puerto Rico, that the crop insurers can be self-financing organizations once they have gotten through an approximately ten-year startup period.

— For the sake of readers not familiar with crop insurance or reinsurance, a brief explanation follows.

Reinsurance refers to the process whereby an insurance organization cedes to another organization part of its insurance liabilities. Reinsurance enables the insurer to handle more risks than it would be able to accept otherwise, and it reduces the risk that in the event of a catastrophe the insurer will suffer losses in excess of its financial resources. It is, in short, a means for financing large losses.

In case of comprehensive crop insurance programs, there exists the

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potential for large losses due to drought, floods, frost, excessive rainfall and similar hazards which might affect a large proportion of the farmers at the same time. The threat of these losses has been one of the more effective deterrents to the introduction of comprehensive crop insurance.

Some countries have considered establishing programs by investing large sums of capital in their insurance schemes in order to provide a reserve for catastrophic losses. Although this is prudent, it is costly since resources which could be used in other development programs are tied up. It is, also, impossible for the poor nations.

Most countries have operated their crop insurance schemes on a pay-as-you-go basis by pledging the full faith and credit of the governments to the insurers. The clear disadvantages of this system are the threat of disruption of budgeted development plans, the stimulation of inflation if government prints money to pay losses, and the uncertainty as to whether or not poor governments will indeed be able to cover claims fully and promptly.

Reinsurance enables a country to pay a relatively small annual premium and to receive a relatively large return on those infrequent occasions when catastrophic losses occur. Reinsurance, thus, makes it less costly and safer to operate a crop insurance program. If crop insurance itself is desirable, then reinsurance is a necessity for all but the wealthiest nations.

The remainder of this paper is arranged in four sections. Section II is concerned with the state of the reinsurance market at present and whether or not there is much unsatisfied demand from crop insurers. Section III reviews five options for managing reinsurance needs. Section IV describes the relevant structural factors of crop insurers and their impact upon reinsurability. The final section presents a summary and recommendations.

## II. CURRENT STATUS OF CROP REINSURANCE

The question which we must address here is: Is reinsurance in such scarce supply or offered under such onerous conditions that a special reinsurance program should be launched by the governments of developing countries and International Development Organizations (IDO's)?

The way to answer the question is by examining the current situation. Informal discussions with crop insurance, government, reinsurance and International Financial Organizations (IFO) officials permit the following incomplete compilation:

### A. Countries and programs with at least five years of experience:

1. Those in which the governments supply adequate reserves and therefore do not appear to want to buy reinsurance from outside are: Japan, U.S.A., Canada, Sweden, and Mexico.
2. Those which manage to purchase even a small reinsurance cover include: Mauritius, Puerto Rico, Israel, South Africa, Zimbabwe, and Panama.
3. Those which could probably benefit from reinsurance at present are: Costa Rica, Sri Lanka and Cyprus.

### B. Countries and programs with less than five years of experience:

1. Those which have started or may start crop insurance programs and may want reinsurance in the next 3 to 7 years are: Ecuador, Bolivia, Dominican Republic, Venezuela, India, Republic of Korea, Philippines, Thailand, Indonesia, Australia, Taiwan, Pakistan and Chile.
2. Those with crop-hail insurance carried out by the private sector which may expand to comprehensive coverage if reinsurance were available are: Most of Western Europe, Argentina and Australia.

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From the above list, it seems that there is no great unmet need for reinsurance at present. The programs mentioned at item A.2. require, in my opinion, that structural adjustments be made before they can qualify for reinsurance coverage. Significant demand should develop in the next five years. An informal survey of commercial reinsurance companies indicates that commercial reinsurance will be available to well-managed crop insurance programs once they gain a minimum of experience and maturity.

### III. REINSURANCE MANAGEMENT OPTIONS

In this section we will discuss five alternatives for financing catastrophic losses. The first three involve the reinsurance mechanism; commercial reinsurers, a pool and an international reinsurance fund. The fourth alternative is banking, which is qualitatively distinct from reinsurance. The final alternative is to provide technical assistance to the insurers so that they can obtain their own reinsurance.

#### A. Commercial Reinsurers

Currently, international commercial reinsurers are only slightly involved in crop insurance, reinsuring just six programs. There are at least three reasons why commercial reinsurers should be interested in crop insurance; (1) it is a new risk, which will help their portfolios to be more balanced, (2) it can generate a fair profit, and (3) there is considerable surplus capacity (i.e. - underutilized capital) in the market at present. However, reinsurers are reluctant to enter into this area. ←

The reluctance stems from three principal problems all of which can be overcome with proper design and management.

1. Catastrophic Hazards -The more likely a direct insurer is to suffer

a large loss, the less attractive it is to a reinsurer. For example, an insurer covering 20 crops grown by 50,000 farmers each in a dozen different areas and over two planting seasons is more likely to be offered coverage than is an insurer of one crop grown by a million farmers in only a few areas. Insurance programs should be designed to provide as much spread as possible.

9 Comprehensive crop insurers cover such hazards as drought, flood, disease, insects, and typhoons. A characteristic of these is that when one farmer is affected, all are affected. This catastrophe potential is a serious problem and must be managed just as the lack of spread. The number of crops, planting seasons and areas where the insurer works must be increased. New programs such as farmer's life insurance and livestock, aquaculture and forestry insurance, farm machinery, buildings and liability insurance have to be added so as to balance the insurer's portfolio.

2. Experience - Most crop insurers do not have much experience to show the reinsurers who require it for calculating a premium rate. Also, crop insurance managers frequently have no previous insurance experience; this further discomfites reinsurers. Finally, there have been several failures in the past which have chastised reinsurers. Therefore, it is necessary for any crop insurer to have a minimum of three to five years of successful operations under stable management to show their prospective reinsurer. This can be gained during the pilot stage.
3. Moral Hazard - In order to manage the startup costs and to provide a guarantee for excess losses during this period, most crop insurance program designers have turned to the government. While providing the

desired benefits, the involvement of government has created another problem: moral hazard. Moral hazard ordinarily refers to the incentives insurance provides the insured to deliberately cause or falsify a loss and collect from the insurer. In this case, we are concerned about the insurer causing ~~improper~~ losses for the reinsurer.

7 The reinsurance relationship is usually protected by the insurer's desire to make a profit or, at least, to avoid losses. This is not the case for a Politically Managed Insurance Corporation (PMIC) since the ultimate motivator is the political status of the program's controllers. (PMIC's are discussed in section IV.) When many farmers suffer a noninsurable loss simultaneously, they are likely to apply pressure to the government which will be tempted to get out of this difficult situation by ordering the insurer to pay. The existence of reinsurance reduces pressures for financial responsibility and results in a practice called "milking," which is the greatest single barrier to a successful reinsurance relationship.

When the reasons for and against reinsurers participation are weighed, and the fact that they are presently reinsuring six programs considered, we can feel reasonably confident about future availability. The major problem seems not to be with the reinsurers but with the quality of insurers seeking coverage. The most productive role for development agencies then would seem to be as a provider of technical assistance to help existing and new programs become Technically Managed Insurance Corporations (TMIC). (TMIC's are all discussed in Section IV.)

#### B. Pool

A pool is an agreement between insurers to cede a part of each insurer's premium income and liability to the pool in exchange for an equal

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part of each other's liabilities and premium.

The pool itself does not assume any risk. Just as any reinsurance program, the pool has several advantages: (1) it spreads risks, (2) it reduces the reserve capital required for any given portfolio, and (3) it enables the participants to increase the amount of coverage in force. Surpluses which cannot be covered by the pool may be reinsured commercially.

PMIC's represent a difficulty for the pool. Some countries will place poor business in it and will tend to run a deficit. Other countries will resent subsidizing these and will withdraw. To prevent this, the pool will have to institute management controls. This is expensive, and can be done more economically by the already existing commercial reinsurers. Pools are effective means for reinsuring "good" risks, but cannot change "bad" risks to "good".

### C. International Reinsurance Fund

An International Reinsurance Fund differs from a pool in that it is capitalized and accepts risks for its own account. Since national crop insurance programs are often controlled and subsidized by their governments, this institution could be established under an agreement between the governments of the interested countries.

As a risk assuming entity, the institution must be provided by the participating governments with adequate capital as an initial reserve. International assistance in the form of development grants or loans does not seem likely at this time. Since commercial reinsurance is possible for TMIC's, donor countries will not want to undercut them. Rather, they would probably prefer to help the PMIC's reconstitute themselves as TMIC's.

It is essential for this fund, just as it is for the pools, that in the long run the receipts (plus interest on investments) should balance with

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payments (plus the administrative costs) to each national crop insurer. Again, some procedure for periodic review of the results for each partner is essential. Otherwise, as we have already seen, some insurers will gain at the expense of others; distrust and dissatisfaction will grow and the institution will not be able to function. A reinsurance fund seems to have the same limitations as do the pools--it cannot make "good" risks out of "bad".

#### D. Banking

The International Financial Organizations (IFO), both public and private sector, present an additional alternative. These organizations can provide loans to cover the large losses with which we are concerned. These can be granted as either standard loans or as contingent loans, and they can be given at either commercial or concessional interest rates. This may be the only source of extranational financing for the PMIC's

A contingent loan is similar to a line of credit. The loan is agreed to before hand; a small holding fee is charged; then, when needed, funds are drawn down; and repayment is made according to previously specified time and interest rate conditions. A difference between contingent loans and lines of credit is that drawdowns from the former are made only upon the occurrence of specified contingencies instead of whenever the borrower wishes.

One important difference between contingent loans and long term insurance arrangements is the scheduling of the payments. In the case of contingent loans, repayment comes after a loss, when the borrower may find it most difficult. With reinsurance, repayment is spread out evenly with part of the loss being paid beforehand.

Whether the loans are made at concessional or commercial rates is a political question which is greater than the scope of this paper. However, if loans are available, it is more likely that the TMIC's rather than PMIC's

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will get either concessional or commercial loans. This is because programs that distribute their benefits according to technical rather than political criteria will be more effective in dealing with risk and uncertainty, and hence more likely to stimulate agricultural production. Unfortunately, it is most likely that loans will not be available at all. This is because the IFO's will be reluctant to invest their limited funds in programs which duplicate the already existing reinsurance institutions.

#### E. Technical Assistance Association

The simplest form of cooperation between national programs is the creation of an office to provide generalized technical assistance for the insurers. It would be similar to a trade association in that it would serve as a communication channel for insurers wanting to learn about reinsurance. It would not replace the reinsurer - broker - client relationship, but would facilitate it. Membership in the association would be considered by the reinsurers as a minor indication of the competence of an insurer.

The association would need to be supported in the beginning by a contribution from international donors but would have to come up with a design for eventual self-financing before those contributions would be forthcoming. Financial self-sufficiency is always problematic for this kind of association.

The association would not be able to place "bad" business, of course, but it could be used to deliver the technical assistance needed to help PMIC's convert to TMIC's.

#### IV. STRUCTURAL FACTORS OF CROP INSURERS

Now let us consider the nature of the insurers being reinsured. The most important single factor is the quality of management -- whether it is technically or politically dominated. The reason for this is that moral

hazard is limited successfully in one case but not in the other. Moral hazard is capable of destroying reinsurance relationships. Several other factors are also discussed below.

In this paper we have been referring to TMIC's and PMIC's as if they were unique and mutually exclusive models of crop insurers. Although many variations exist between these conceptual poles, it will help the discussion that follows if we assume that they are indeed unique and mutually exclusive.

A. Management

What are the management options and what are their effects?

Management, as we have stipulated, can be dominated by either political or technical/professional concerns, not by both. If decisionmaking is controlled by political forces, the insurer will be unable to resist certain pressures for ex gratia loss payments. This is not necessarily the case for PMIC's in other lines of business--automobile insurance for example. There, when an insured suffers an uninsured loss, he will seldom be able to force the insurer into paying. However, with crop insurance cases often arise where several hundred, or even thousand, farmers suffer an uninsured loss at one time.\* Here, because of the force of their numbers, they often are successful in obtaining payment. If a government is close to an election or is feeling insecure for any reason, the leverage of the insured farmers is increased. If

\* In insurance terminology, we can differentiate between these two cases by pointing out that in one case independent exposure units are insured (automobiles) whereas in the other case the exposure units are highly correlated (e.g., neighboring farmers exposed to drought). It is this exposure unit feature in combination with the PMIC, and not the PMIC per se, which makes reinsurance for crops so difficult. The case of I.N.S. (Instituto Nacional de Seguros), a government insurance monopoly in Costa Rica, is instructive. Among reinsurers, I.N.S. has a reputation for being one of the most professional and competent insurers in Latin America. It has had no difficulty in obtaining and keeping reinsurance for its regular lines--fire, life, auto, health, etc. Based on this excellent reputation it convinced a group of German, Swiss, British, American, and Swedish reinsurers to provide crop coverage several years ago. The program developed well until a large loss occurred at an inauspicious time. The reinsurers paid their claims, of course, but then withdrew from any further participation.

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the losses can be passed on to a reinsurer, fund or pool, then restraint is a most precarious virtue.

TMIC's may take several forms. They may be regular stock companies. They may be mutuals or cooperatives. They may be town mutuals (very small companies operating in limited areas) as in Japan. Finally, they may be mixed-sector enterprises, but only with limited government control. A unifying element among all these forms is that they are concerned with either making a profit or, at least, as in the case of the cooperatives, avoiding losses.

We should make one last observation before leaving the PMIC's and TMIC's--that PMIC's work reasonably well in one kind of country. These are the affluent nations which can afford to pay for their political decisions. This is the case for Japan and the U.S.A., with their modified PMIC's, and for Canada, Sweden and Mexico. However, small and poor countries and especially countries exposed to severe catastrophic losses (e.g., typhoons to island nations) cannot afford the luxury of PMIC's. For them, reinsurance is especially crucial and a TMIC type organization indispensable.

#### B. Financing

What is the probability of being able to build self-financing insurers? What is the effect?

Self-financing insurers now exist in Puerto Rico and Mauritius, thus demonstrating the feasibility of the idea. Both of these are broad risk (windstorm) rather than comprehensive insurers. This means that the need for inspection and administrative costs are lowered but they must still cope with the problems associated with catastrophic risks.

Theoretically, it seems possible to have a self-financing, fully comprehensive crop insurer if it is directed to small scale commercial farmers (SSCF) and has a diversified portfolio. SSCF's produce a surplus with which

to pay premium. Credit linkages, as we shall see below, are also important. Initial results from a project in Latin America support the feasibility of self-sufficiency.

There are two difficult financial problems for a comprehensive crop insurer. One is the handling of large losses and the other the startup of operations when reliable and representative actuarial data do not exist.

The absence of adequate actuarial data initially requires that the insurer operate "in the dark" until its own experience can provide the necessary actuarial data. Therefore, the insurer must use judgmental rates in the beginning and must confront the possibility of heavy losses before it has had a chance to build up reserves. This is one of the core problems which has kept the private sector out of crop insurance and has reserved it incorrectly, as an exclusive field for social insurance.

One feasible strategy is that government underwrite the startup costs and guarantee excess losses during this period. This does not mean, however, that program designers must produce PMIC's which will be at a disadvantage in the next stage when they want and need commercial reinsurance in order to finance the truly large losses.

If programs can be made to be self-supporting, then not only will government be saved the expense of supporting it, but it will also be freed to allow the insurer to function as a TMIC.

How is the self-financing, technically managed insurer to be built? Here is one scenario; there are many.

A mutual insurer is established. Each farmer/policyholder has a vote for the board of director. The insurer begins with a management appointed by the promoters.

A development loan of the two-step type is obtained by the government from an IFD or aid donor and passed on to the insurer in local currency.

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Conditions might be as follow:

Loan to government	Reloan to insurer
10 years grace at 2%	10 years grace at 5%
20 years payment at 3%	20 years payment at 6%

The insurer would place the funds in productive, employment generating investments at rates higher than the repayment interest. This margin would underwrite the startup administrative costs. The government's investment would be protected by the supervision provided by its Insurance Commissioner.

By year 10 the insurer should be self-sufficient if it has developed a large, diversified portfolio. By year 30, it should have paid back the loan and generated an equal capital of its own.

e. CREDIT LINKAGE

What is the nature and the effect of the credit linkage?

A credit linked crop insurance program is one where most of the following features can be found.

- Banks' clients in specified classes are required to purchase the insurance as a condition of the credit; (e.g., rice farmers in certain provinces)
- The farmer applies for the insurance automatically when he

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applies for the loan;

- The premium is added to the farmer's loan, but withheld by the bank and paid directly to the insurer;
- The insurer covers the loan (including the premium), interest and, perhaps, a small extra amount;
- Insured amount, loan amount and costs of production are all roughly equal;
- The farmer, banker and insurer all agree that the farmer will use a specific technology package;
- The banks act as a communication channel for reporting farmer losses back to the insurer;
- The insurer pays losses into the farmer's bank account; and
- The bank deducts any outstanding loan balance and refunds the difference to the farmer.

It is actually the first item in this list that causes a program to be credit-linked. The others are necessary or desirable for implementation.

Credit-linkage provides a means for protecting against adverse selection. This occurs when too many persons with a higher-than-planned probability of loss purchase the insurance. It is a serious problem for insurances in which participation is voluntary. ~~X~~ credit-linked programs are semi-obligatory which works to control ~~and~~ adverse selection by automatically selecting an average group of farmers.

Credit linkage also facilitates low cost administration and guarantees good number of clients. These things have a strong impact on the financial viability of the insurer.

Finally, credit linkage identifies clients who tend to fit the SCCF description rather than that of the subsistence farmer, and situations which

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are more likely to support development rather than disaster relief goals.

In general, it can be said that credit linkage supports a strategy characterized by TMIC, self-financing, SCCF and development goal features.

F. Summary

In this section we described several structural aspects of crop insurers which affect their reinsurability. The first and most important was management decisionmaking; whether it would be politically or technically/professionally dominated. We called the resulting organizations PMIC's and TMIC's. Because of their inability to control moral hazard, we concluded that reinsurance would be unavailable for PMIC's or, if obtained, unstable. Further, we concluded the TMIC's could be found in stock or mutual companies, cooperatives, town mutuals, and even mixed sector insurers if special precautions were taken to guarantee managerial independence.

Next we examined financial features of crop insurance. The lack of adequate actuarial data early in the program as well as sizeable startup cost may lead to a dependence on government for financing. If the programs are not properly designed, PMIC's rather than TMIC's will result. Later, when mature, the programs will need reinsurance for large losses but if they have used the government-financed-PMIC strategy, this will be precluded.

We then looked at the impact of goals on the insurer and identified two discrete bundles of goals. The Disaster Relief Goals assume that farmers cannot be self-sufficient and commits the program to the government-financed-PMIC strategy. The Development Goals have the opposite impact.

The clientele to whom the insurance is directed was examined next. Poor, small farmers were not seen as a monolithic group but one that could be usefully differentiated into subsistence and SSCF types. Choosing SSCF permits a "self-financing-development-oriented-TMIC" strategy. Choosing

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subsistence farmers leads in the opposite direction unless a subsidy channeled through some other system raises the subsistence farmers to SSCF status.

Finally, the issue of credit linkage was discussed. Linkage with credit makes the programs easier to administer, the self-financing strategy possible, supports the development goals, and tends to select SSCF type clientele.

Taken together, these five items define two discrete crop insurance strategies. These can be called the PMIC and TMIC strategies and are shown below.

#### TWO CROP INSURANCE STRATEGIES

STRUCTURAL ELEMENTS	TMIC	PMIC
1. MANAGEMENT CONTROL	TECHNICAL/ PROFESSIONAL	POLITICAL
2. FINANCING:		
A. STARTUP	GOVERNMENT PLUS PRIVATE	GOVERNMENT ALONE
B. MATURE PROGRAM	SELF-FINANCING PLUS REINSURANCE	GOVERNMENT SUBSIDY AND FARMER'S PREMIUM
3. GOALS	PROMOTE AGRICULTURAL DEVELOPMENT	PROVIDE DISASTER RELIEF
4. CLIENTS	SMALL SCALE COMMERCIAL FARMERS	SUBSISTENCE FARMERS
5. CREDIT LINKAGE	LINKED	LINKED OR NOT

#### V. SUMMARY

The idea that IFO's and IDO's promote some sort of international reinsurance scheme for crop insurers does not seem to be justified. Of fourteen programs in existence for at least five years, six have some reinsurance, five do not wish to purchase coverage, and only three want but have been unable to arrange or keep coverage. Each of these three programs could, in my opinion, obtain reinsurance coverage if its management and financial structures were changed.

There are presently about fifteen new insurers which will be requesting coverage in three to seven years. Many of these are not being structured as TMIC's and will have difficulty in establishing permanent reinsurance relationships in the future.

Since availability of reinsurance depends on the quality of the insurer's structure, it would seem that the most productive role for the IDO's is as a provider of technical assistance during the design stage. This would enable the reinsurance connection to be made later on. An optimal role for the IFO's is to provide the financing for the capital and startup costs of the TMIC's.

The fact that reinsurance is absolutely necessary for any country or insurer with limited capital if they wish to provide a high quality insurance guarantee to a large number of farmers and still stay in business when large losses occur, is part of the justification for IDO and IFO involvement. The impact of crop insurance on farmers, agricultural production, credit institutions, and extension services is the other part.

Two other options for providing reinsurance were seen as impractical. A reinsurance pool constituted by the various insurers would be vulnerable to moral hazard and would tend to disintegrate quickly. An international reinsurance fund would suffer from the same problems, but it would also have difficulty in attracting capital, as potential donors would point to the duplication of efforts with the established commercial reinsurers. Another option, a technical assistance office, would not be very effective as it would have no impact on the moral hazard issue.

The final option --banking-- seemed to be the only hope, although a very slim one, for the PMIC insurers. They should discuss the situation with the development banks, but again one must question the wisdom of using IFO funds to compete with the already existing international reinsurance