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I. FOREWORD

The Interamerican Institute for Cooperation on Agriculture, the specialized agricultural development agency of the Interamerican System, has recently established the Division of Agricultural Insurance and Credit to meet the growing demand for technical expertise in agricultural insurance by the its member states. At present, the Division is helping to establish and manage pilot agricultural credit and livestock insurance programs in Bolivia and Ecuador. It is advising the highly successful Panamanian program and working closely with the Venezuelan government in the establishment of the new Venezuelan insurer. In addition, the Division is training the Dominican staff of an insurer soon to be established in Santo Domingo. The Division has also carried out technical missions in Peru, Colombia, Chile, Trinidad & Tobago, Jamaica, Barbados and the Windward Islands, and has trained technical and managerial staff of the insurers it advises in Mexico, the United States, and Puerto Rico. At present, the Division is studying a hemisphere-wide reinsurance mechanism to spread the risks of the individual national programs over all the countries of the hemisphere which have insurance programs. Finally, the Division is conducting an extensive research effort to measure the cost and benefits of an agricultural insurance program for the farmer, for the bank, for the agricultural sector and for the society as a whole.

The present document forms part of a series of works on various aspects of agricultural insurance in the countries of Latin America and the Caribbean. In outline form this document set forth the need and justification for the establishment of a national agricultural insurance program as one component of a rural development strategy. It summarizes the experiences of other nations in the field of agricultural insurance, and based upon these, sets forth three distinct institutional structures for the organization and operation of an Agricultural Insurance Company.

THE ROLE OF CROP CREDIT INSURANCE IN RURAL DEVELOPMENT

Dr. William M. Gudger*

*Chief of the Division of Agricultural Insurance and Credit, IICA, P.O. Box 55, 2200 Coronado, San José, Costa Rica.
The opinions expressed in this document are those of the author and not necessarily those of IICA.

1. The Need for Agricultural Insurance Programs in Rural Development

1.1. Introduction

In almost all human activities risk and uncertainty are inherent and inevitable. It is rare indeed, that today a person has not developed his or her own plan for managing risk. Almost 100% of the readers of this publication have some system of risk management, be it savings against unexpected expenses or an insurance policy against an unanticipated occurrence; for example, a house fire or an auto accident. Most have an insurance program to cover two certain occurrences - old age and death. The former protection offered by the state in the form of social security and pension schemes, the latter usually by private companies in the form of life insurance. Likewise, the majority of businesses have developed a risk management program to protect their economic assets and personnel against unexpected losses. Many of the larger enterprises now have a professional "risk manager" whose responsibility is to establish and operate an insurance program.

The instrument we call "insurance" is historically relatively new. In its current form, it may be said to have originated in 18th Century Britain. The majority of the insurance companies of the world have been created in the last 75 years and perhaps well over 90% of the present coverage offered by these companies has been written in the last 30 years. With the growing complexity of society, more and more kinds of risks have been insured against risk and uncertainty. Since the 1930's, industry and commerce have accepted and utilized insurance as an essential management tool in almost all aspects of their operations.

The partial exception to the general acceptance of insurance has been in agriculture and especially among the smaller, less well capitalized farmer. Most of the "developed" countries have now created systems of insurance which offers the farmer protection against uncontrollable events. The origin of these systems is frequently a major disaster which is of such magnitude that the traditional risk spreading devices fail and many agricultural producers are ruined.

In Latin American and the Caribbean, the countries have long been aware of the advantages of establishing a system of managing the risks that are implicit and inevitable in agriculture. Beginning with Mexico and Puerto Rico, most have carried out feasibility studies and in some cases have established agricultural insurance systems. It is probable that during the last 20 years feasibility studies have been carried out in almost all of the countries of the hemisphere. In the Caribbean, Puerto Rico has operated a successful agricultural insurer for over 20 years. The Dominican Republic is presently establishing a new insurer. Several of the islands republics, particularly Barbados, and Jamaica have been very interested and active in studying the possibility of a Caribbean Wind Storm Insurance Association which would spread the risk of hurricane wind losses over the entire Antillian chain and offer the islands' agriculture protection against frequent, but irregular wind storms. In Latin America, Mexico operates a very large nationwide program to serve small farmers. Smaller and newer programs are working in Costa Rica, Panama, Ecuador, Bolivia, and Venezuela.

Insurance in its essence is merely the formalization of functions that have been delegated to other social structures, such as the family, the village, or a network of friends and associates. In recent years, we can add national governments, and international disaster relief organization to the list of donors whose help is extended after a disaster. Instead of sharing the production or mounting an ad hoc disaster relief program after the fact, insurance through a civil contract establishes the conditions under which an insured will receive a specified indemnity. The concept of shared risk is as old as human misfortune; the modern instrument is insurance. From the point of view of the individual, insurance formalizes these old social obligations to help one's neighbor in bad years, and permit the creation of a "pool", which by large numbers and geographical and temporal dispersion permits a sharing of risk. The group members pay a small fee in good years and recover part of their losses in bad ones.

Based on this description of the fundamental nature of insurance as a risk spreading device, we can begin to explore some of the advantages that agricultural insurance offers to the farmers, the Agricultural Credit System and to the society as a whole.

1.2. Insurance and the Farmer

From the farmer's point of view, insurance is in the first instance a financial instrument. The basic purpose of any insurance policy of the property-casualty type is to prevent a loss of sufficient gravity to endanger the economic life of the enterprise. Insurance by means of indemnities functions to level the income stream across years. Agricultural insurance establishes a minimum income beforehand for the farmer. The

importance of income leveling is that the farmer in the first instance can maintain himself and his farm in production and in the second instance can develop his activities and investments as planned without being obliged to sell resources or halt programmed investments because he has suffered a natural disaster. The reduction of the impact of natural cycles on the agricultural enterprise permits more rational planning and a rapid recovery following a natural disaster.

The second reason that agricultural insurance is beneficial to and desirable for farmers is that in general farmers confront serious problems in obtaining credit and in bad years are incapable of repaying loans. Banks must demand adequate guarantees to extend credit. A mortgage or lien on the crop are the most common. However, in certain years farmers will, due to adverse experience, lose the mortgaged goods in order to repay their credit. This process is counter productive for both the farmer as well as for the lender, as the lender loses a client, and must bear the costs of legal process and disposition of the farmer's goods. In many countries, it is politically impossible to take away the productive resources of small and medium size farmers whose livelihood depends upon them. Agricultural insurance offers an escape from this vicious circle of inadequate credit due to a lack of guarantee. An insurance policy taken in the names of both borrower and lender offers a concrete guarantee to the bank that it will recover its loan if the farmer suffers from natural losses. Thus, the farmer can maintain himself in the credit system in good and in bad years and the bank will have a reliable client who can always repay his loan.

In addition, an insured farmer can dramatically alter his debt-to-equity ratio. Frequently, a small farmer lacks adequate resources to guarantee the credits that his enterprise requires. Given that his fixed assets are small, the farmer can obtain credit equal only to a portion of these assets. Many lenders will lend only 50-75% of the value of these assets. With the introduction of an insurance policy in the name of the farmer and the lender, credit in larger amounts becomes possible, given that the guarantee presented, the insurance policy, protects the lenders against default produced by all natural hazards. Thus, agricultural credit insurance permits the utilization of credit based upon need, and not exclusively upon the assets the farmer can offer as collateral on his loan.

The traditional system of risk management through the diversification of production options on the farm is rapidly disappearing. In its place, agriculture, especially highly productive commercial agriculture, is developing specialized systems of production. This specialization produces a much more efficient system of production, but is inherently more risky given that a natural phenomena which affects a single productive option will have a substantial impact on the financial viability of the enterprise. For example, a diversified small farm is much less risky than a specialized farm producing only one or two crops. The latter is likely to be more efficient but more exposed to a natural phenomena than the former. Agricultural credit insurance permits specialization without increasing the implicit production risk.

Up to this point, the advantages of agricultural credit insurance; i.e. leveling income fluctuations, guarantee for production credit, modification of the debt-to-equity ratio, and the ability to specialize in fewer more productive options without increasing the implicit production risks, are advantages enjoyed by any enterprise which utilizes insurance as a management tool. At the outset of this document, we mentioned the term risk. Risk is the possibility and the probability of an economic loss. A equally important factor in a farmer's decision. Making is uncertainty. Uncertainty is a more amorphous concept. In most enterprises, a given technology can be expected to produce a given quantity of a product in any location, other factors being equal. Within certain parameters, the production function can be determined. In agriculture, however, exogenous factors beyond the producer's control assume disproportionate importance. A technology transferred from a experimental station to a farm will probably not produce the same yield due to a series of factors such a microclimates, soils, and control of technology by the producer. The importance of agricultural credit insurance in the technology transfer process is that insurance is capable of managing not only risk (the probability of loss) but also uncertainty, the preoccupation of the producer over whether the technology is adequate or not to his particular productive base.

Traditionally a farmer could sow a small area and measure the results. However, increasingly complex technology entails a very large fixed investment. For example the fixed investment for mechanized grain production or drip irrigation requires that the area under production be of sufficient size to cover the cost of the technology and yield a profit. An insurance policy which at a minimum guarantees that a farmer can repay his loan if he suffers a natural loss is a strong

incentive to technique adoption. A policy which goes one step further and guarantees a certain yield (valued at a preestablished price) is an even stronger incentive. A well designed insurance scheme facilitates technological change and permits a rapid reply to market signals by removing a large part of both economic risk as well as the farmer's uncertainty.

While agriculture in general is exposed to natural risk, the problem is much more severe for the small and poorly capitalized producer. A farmer with few resources is always closer to financial distress. He has few resources that can function as a "shock absorber" in times of adversity. Natural fluctuations that would be of little importance for a large agricultural enterprise could ruin a small one - or at least force a return to subsistence production. Under these circumstances, many small farmers select the most secure technological option, not the most productive. In many cases, the option chosen by a farmer unable to sustain a loss is the traditional technology which requires few inputs and produces at least enough for the subsistence of the farm family even under adverse conditions. Generally speaking, the closer a farm is to being economically marginal the more conservative the technological options that are selected.

A well designed agricultural insurance program functioning as an integral part of a rural development program can offer a strong incentive for technological change. It can guarantee the production credit and at the same time protect the farmer against a catastrophic loss due to natural hazard. We in IICA see more clearly with each new project that we mount that agricultural insurance has a major impact upon small farmers with

natural resources adequate to permit the utilization of modern technology but who lack sufficient guarantees to obtain credit and the reserves to sustain a major loss. For a small farmer, agricultural insurance has a large multiplier effect. It multiplies the effect of both credit and technology program's and strengthens the financial position of the farmer.

1.3 Agricultural Insurance and the Agricultural Credit System

In Latin American and the Caribbean, it has been estimated that only about 15% of the farmers receive bank credit. Within this 15%, most of the credit is concentrated among large, commercial and export-oriented farmers. One of the greatest obstacles to serving small and medium size farmers has always been the very high cost of operation and the low rates of recovery, especially when farmers are affected by adverse weather. A well designed and efficiently managed insurance scheme can alleviate the problem of recovery and substantially lower the lender's cost of operation.

The most direct advantage for the bank is that an insurer can guarantee that a farmer affected by adverse weather can repay his loan. The insurance also functions as a surrogate for lien on the crop or a mortgage. For farmers who do not have sufficient fixed investment to guarantee a loan, an insurance policy can serve as a guarantee. With an agricultural insurance scheme in operation the bank can dramatically reduce its portfolio of delinquent loans. With insurance, lending to agriculture become a more attractive, lower-cost alternative.

As an agricultural insurer is in the first instance in the business of detecting and remedying risk before it produces a loss, its

agent can take over almost all of the tasks of supervision of credit. An agricultural insurance inspector must periodically verify that the credit is being used to purchase the required inputs, that the inputs are used in a timely and correct manner, and that they are producing the expected results. Thus, an agricultural insurance inspector must function as an extension agent and a credit supervisor. The difference is, of course, that if an agricultural insurance inspector detects diversion or misuse of credit or inputs, he can take the appropriate action. He may give the farmer a 2 or 3 day period to apply the input or perform the labor; if it is too late, he may reduce the farmer's coverage and advise the bank of the reason so that the bank may adjust its line of credit accordingly. An agricultural insurance inspector assists the honest, diligent farmer to utilize credit and technology while trying to detect any deliberate or inadvertent misuse of one of the scarcest development resources.

It is most important to note that a bank does not know in many cases whether its clients can repay their loans until the end of the agricultural cycle. After the harvest, it is difficult to verify the conditions that allegedly caused a loss and makes payment impossible. Many times if the condition were detected, it could be remedied. In other cases, some clients may have simply have misused the credit and claimed a natural loss. Agricultural insurance can detect cases of moral hazard, where credit is diverted or good agricultural practices are not used. While insurance will cover natural losses, it does not insure against acts of omission or commission that produces or aggravates a loss. Thus, from the bank's point of view, an insurer can "purify" its portfolio by paying for honest natural losses and rejecting claims arising from diversion of credit and incompetence. A

bank in turn can move these farmers to special programs or eliminate them from its portfolio, thus channeling scarce production credit to honest conscientious farmers.

1.4. Agricultural Insurance and the Political Economy of Development

A developed agricultural insurance system has very substantial advantages for agricultural sector policy planning. Offering insurance for a crop provides a strong incentive to produce that crop as the farmers' risk are dramatically reduced. Numerous countries have utilized it to assist in achieving self-sufficiency in a given crop (rice in Japan) or for stimulating exports (winter fruits and vegetables in Mexico). By offering protection against natural risks, insurance serves as a production incentive. By not offering or it by substantially raising the premium, it is possible to disincentivate other options.

If a subsidy is provided to agriculture, insurance can serve as a highly efficient channel. Insurance is not fungible as is credit. Likewise, it is far more specific than a subsidized interest rate. Premium rates can be adjusted to very small unit, even to an individual farm. Interest rates seldom can be so selective. Thus, insurance can channel a non-fungible subsidy to the crops and class of farmers that agricultural policy seeks to stimulate.

From the point of view of the central government, a developed agricultural insurance scheme protects it from having to mount unexpected ad hoc disaster relief programs. By contributing to the insurer's reserve, a central government can avoid costly, and usually inefficient, disaster relief programs, and instead budget a regular outlay. Recently, the U.S.

has cancelled its disaster relief program and channeled the funds into the agricultural insurer. Farmers are advised that the insurer is the proper instrument to manage their risks and that the government will no longer mount disaster relief programs or respond to political pressures for loan extensions and cancellations. The response to agricultural disasters has moved from the political sphere into the technical one. Farmers who do not take proper precautions, and purchase a subsidized insurance may not later try to utilize the political system to obtain relief.

Finally, there is some evidence, albeit tentative, that it is less expensive to offer agricultural credit with insurance than to do so without it. Agricultural insurance appears to reduce the net cost of offering credit, particularly to small farmers, through its inspection and risk management services. For example, the administrative cost of agricultural insurance in Mexico, which has nationwide agricultural insurance system, is about \$7 U.S. per hectare (\$2.83 per acre). That cost, however, appears to be more than offset by the improved recovery rate, and the risk detection and risk prevention services. The average loan size was about \$300 per hectare (\$120 acre approximately). For only \$7 per hectare more in administrative cost, the bank is guaranteed a very high recovery rate. The administrative cost of insurance in the Mexican case is only about 2.3% of the loan size.

When the cost of operating an agricultural insurance scheme is viewed in a systemic context, it is clear that most of the costs of insurance are transfer payments, not new costs. What the lending agency recovers, the insurer pays out in indemnities. Thus, the money flows through the system in a different and more efficient way. Banks and farmers do not have to carry unpaid debts and do not suffer the consequences of the servicing them.

The administrative costs of insurance are likewise paid out by other agencies in the form of bank credit supervision and extension. Finally, a well developed insurer reduces or eliminates the need for state run ad hoc relief programs. At a time when revenue fall due to losses in agricultural sector, the state is called upon to mount a disaster relief program. Insurance obviates this need to the extent that the state has helped build a well capitalized, far reaching program. That insurance eliminates the need for disaster relief programs when revenue flows are impaired is perhaps the strongest argument for state participation in creating a reserve. Then, if a long term systemic approach to rural production credit is taken, it is clear that insurance implies no new administrative costs (indeed they may be lessened) and appears to imply no new capital costs.

1.5. CONCLUDING OBSERVATIONS:

This discussion, trying to remain non-technical, has looked at only one type of insurance --agricultural production, and specifically agricultural credit, insurance. In the following section, we will discuss the various types of agricultural insurance in a somewhat more technical manner. However, before concluding this discussion, we would like to point out that both livestock and agricultural infrastructure are insurable and frequently form part of the agricultural insurer's portfolio.

Livestock insurance is essentially a pre-paid health care plan for animals. The premium enables the technical staff of the insurer to maintain the health of the insured animals by managing the risks and applying all necessary preventive and curative treatment. The premium may be adequate to cover only this service or, at a higher rate, it may pay part of the market value in case of death or loss of function, the two most commonly insured risk.

Infrastructure and agricultural machinery are likewise frequently insured. Both of these are "commercial" risk whose experience is well known, and for which rate-making poses no particular problem. These risks, since they are not catastrophic in nature, add an element of stability to the portfolio. When coupled with agricultural and livestock insurance, the chances of catastrophic losses are markedly diminished.

Life insurance for producers can also be included on a group basis at a very minimum premium. Assuming normal mortality rates, a premium of \$7 per \$1.000 per year should cover the cost of this insurance. If all these elements are combined into a well balanced portfolio, the chances of severe losses that damage the reserve of the insurer can be minimized.

2. THE EXPERIENCE OF AGRICULTURAL INSURANCE IN DEVELOPED AND DEVELOPING COUNTRIES

2.1. The basic terminology of Agricultural Insurance

Agricultural insurance is frequently spoken of as if it were of a single type. However, upon reviewing the existing systems of agricultural risk management, one is struck by the wide diversify of the systems.

One problem to understanding these systems has been and continues to be imprecise language. To clarify the terminology and make clear exactly what each type of insurance provides protection against and how each of these protections are written, it is useful to review the different schemes currently in use.

a. Agricultural insurance is general term for insurance that covers risks in the rural sector. It includes insurance against the risks inherent in agricultural enterprises and the associated activities such as transport, storage and processing. Frequently, it also includes livestock insurance and may include fish and shrimp pond insurance; structures and machinery are also included.

a.1 Within the field of agricultural insurance it is possible to define several important types of systems that protect producers. The most traditional is Crop Insurance. Frequently, other systems of insurance are mislabeled crop insurance. In fact, crop insurance refers to a very specific coverage. Its coverage guarantees a fixed number of units of yield per acre or hectare. The yield guarantee is multiplied by the conversion price to determine the indemnity in case of a loss. It may be written on an all risk basis or on a named peril or specific risk basis.

The premium is usually differentiated and variable depending upon the zone, the technology employed, the past experience, and the level of coverage selected. The number units of yield may be fixed based upon average historical yield of the farm or area yield. The conversion prices can be set based upon the support price, the expected market price or upon an insured's choice in which several different conversion prices are offered at various premium rates.

Crop insurance exists in slightly different forms in the U.S., Japan, Israel, Canada, Sweden, and other developed countries. The U.S. and Canadian systems are voluntary; Japan, Israel, and Sweden have obligatory insurance systems.

This system functions in the following manner: A farmer is offered or obligated to take a policy for a specified crop. He agrees to pay a premium that varies with the crop, the zone, the expected yield, the technology, and the level of coverage. Sometimes his past claims record is a factor in rate making. The policy guarantees the farmer that if accepted agricultural practices are followed, he will produce certain number of units per hectare which are valued at a preestablished price. If he suffers a loss due to one or more of the conditions included in the policy which reduces his yield below the guarantee, he is entitled to an indemnity. The indemnity is usually determined by measuring the salvage, or the part of the yield that remains, and subtracting it from the guarantee. The difference is multiplied by the conversion price to determine the indemnity. As a general rule, the various factors used in determining the indemnity are set so as to produce an indemnity that will not

exceed the direct costs of production or 70% of the expected value of the harvest. This type of indemnity setting is designed to protect the insurer against moral hazard - that is, losses caused in order to collect indemnities.

A variation on crop insurance that is frequently used in developing countries is crop credit insurance. It is written in much the same way as crop insurance. The coverage is stated in units of yield valued at a preestablished conversion price. It may be all risk or named peril insurance. The principal difference is that this insurance guarantees only that the policy-holder will be able to repay his agricultural production credit loan. The minimum value of the indemnity is usually the direct production cost incurred minus the value of the salvage.

The crop credit system works in the following manner. A farmer who takes a production loan (usually from a state bank) also take a insurance policy. The policy becomes effective with the germination of an adequate number of plants and remains in effect, assuming adequate cultivation practices are utilized, until the harvest. When a loss caused by one of the conditions covered by the policy occurs, the farmer and the insurer decide if it is economically feasible to carry the crop through to harvest. If the loss is early in the cycle or very severe, the crop may be turned under and declared a total loss. In some cases, a reseeded may be possible, in which case the policy is modified to cover this. The indemnity of a crop not carried through to harvest is usually the direct production cost up to the time of the loss. The direct production costs usually include some of the estimated value of the farmer's own labor and thus, the indemnity may exceed the amount of credit disbursed. Payment

of the indemnity is usually made directly to the lender and the difference paid to the farmer. If a crop is carried through to the harvest, the units of production are multiplied by the conversion price to determine the salvage value. This is then subtracted from the recognized direct costs of production to determine the indemnity.

It is important to note that these two systems, crop insurance which guarantees a specified yield and crop-credit insurance which guarantees repayment of production credits, have developed under quite different circumstances, and reflect the state of the agricultural sector. Crop insurance is possible when production units are large and uniform in term of soils and climates, where the technology utilized is similar, where infrastructure is good, and when production data reliable over long time spans. These conditions prevail in most countries with crop insurance. They are characterized by relatively uniform yield over wide areas, quick adoption of new technology by farmers capable of utilizing it. Relatively little production is retained on farm. The product is sold through a highly developed marketing system which made verification of yield relatively easy. Likewise the availability of time series yield data in highly disaggregate form facilitates premium calculation.

Crop credit insurance is usually found in countries that are characterized by small holding which exhibit uneven technique adoption and extreme variability in yields due to microclimates, soils quality, technology utilized, and the skill of the farmer. Much of the production remains on farm. Infrastructure is usually less developed and, time series data is usually unavailable or available only in highly aggregated form.

Crop credit insurance is a more conservative system better suited to the situation of most developing countries, especially those whose agriculture is predominantly subtropical or tropical rain fed agriculture. It should be noted that crop credit insurance through its operation collects the data required for a gradual conversion to crop insurance. It likewise assists farmers to adopt modern technology and control the many conditions that are responsible for yield variation. It is to be expected that insurance systems will grow and change with the development of the sector. Crop credit insurance can lay the basis for a crop insurance system without at the outset making unrealistic demands in terms of data and capital upon governments initiating insurance for the agricultural sector.

2.2. The Experience of Agricultural Insurance Around the World

For a country considering the establishment of an agricultural insurance program it is of the utmost importance to carefully study the existing programs in order to utilize selected aspects of these insurers and to avoid the errors of the past. The following section is by no means a comprehensive review. It instead outlines the administrative and financial structures of several distinct types of insurers operating in the developed countries as well as those in the developing countries. The selection is designed to provide the reader with a panorama of the potential types of structures and the advantages and problems of each.

JAPAN

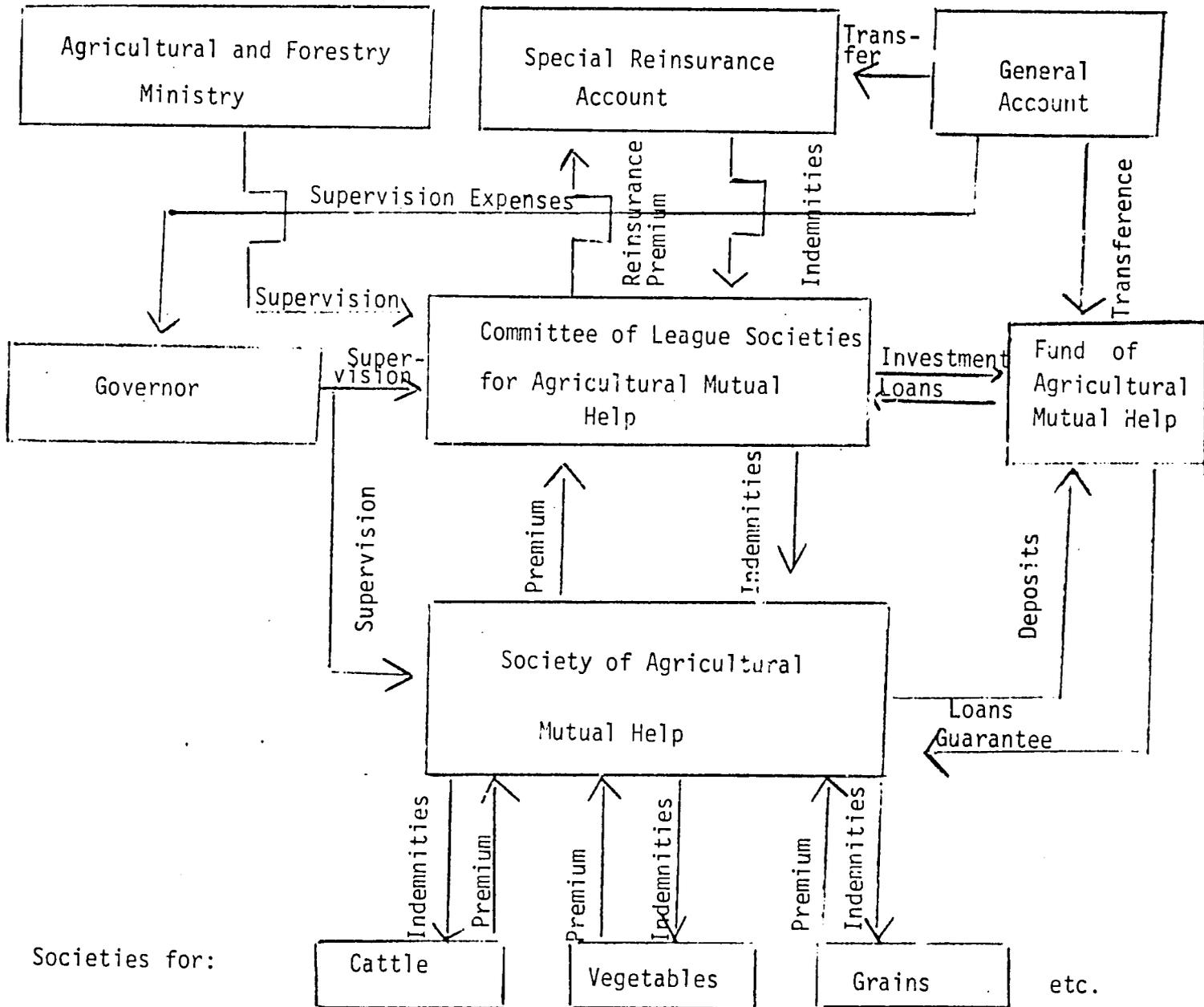
The Japanese agricultural insurance system was organized in 1939, but did not function until after World War II. In 1947, the system was reorganized under the Law for the Compensation of Agricultural Losses. The Japanese system is highly subsidized, partially obligatory and cooperative in nature. In addition to covering the administrative costs of the insurer, the Japanese government reinsurs the system. See Figure No. 1.

The Japanese program is all risk insurance that covers about 70% of the expected yield valued at 90% of the prices set by the state. The actuarial experience has in general been unfavorable. However, the system is designed to offer a strong production incentive. The system has transferred substantial volumes of resources to small farmers, especially paddy rice producers located on mountain slopes. Given the population density of the Japanese islands, agriculture of necessity must be intensive and highly productive. The insurance system has worked to help reinforce the highly intensive and productive agriculture. In addition, a major Japanese goal has been to achieve self-sufficiency in rice. The insurance system has played an important role in realizing this goal.

ISRAEL

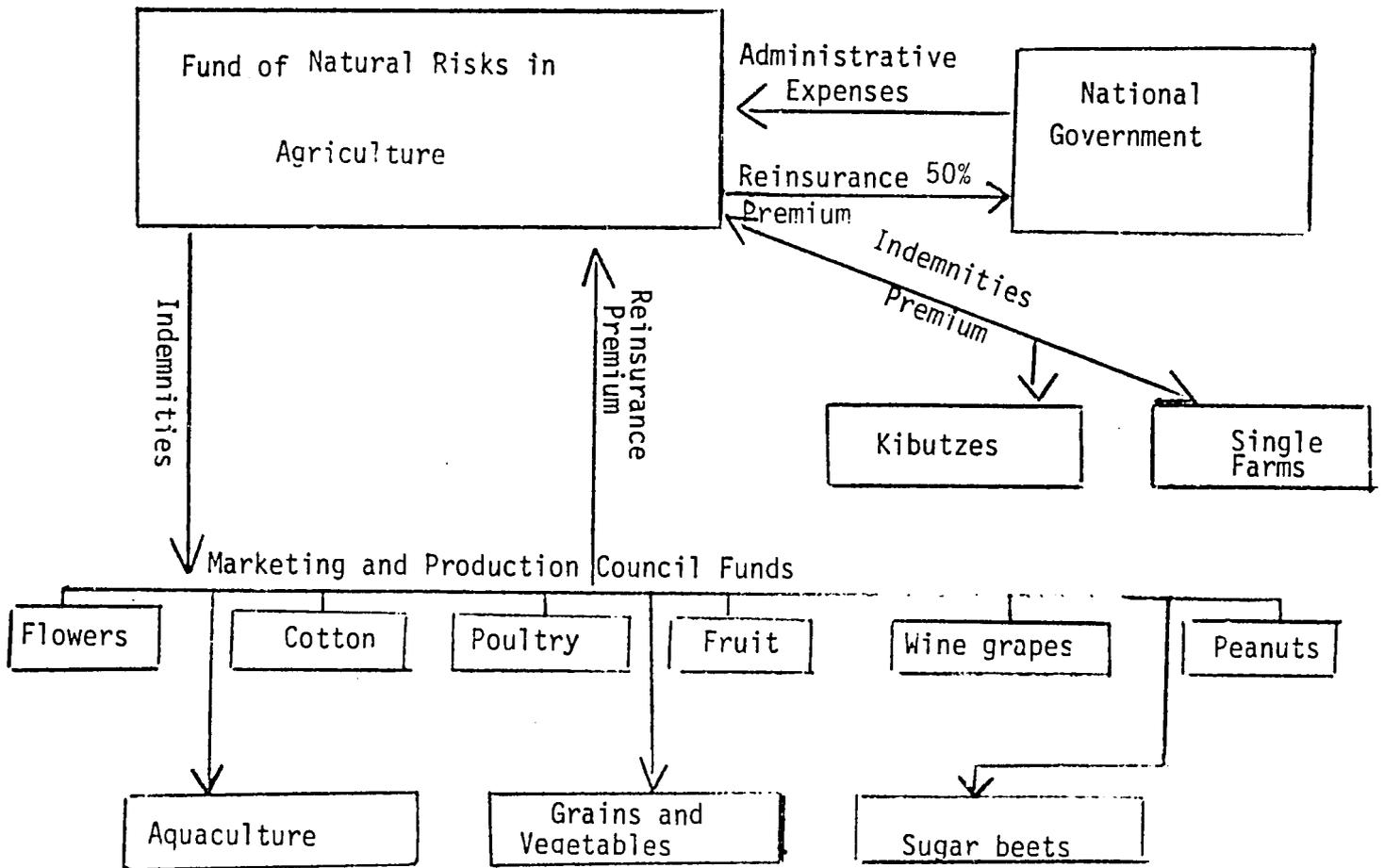
The State of Israel established the Fund for Natural Risk in Agriculture in 1967. It is a highly subsidized system which is reinsured by the state. The cover offered is "all risk" and compulsory once a production and marketing association for the crop is organized. In addition, kibutzes and individual farmers can participate on a voluntary basis. The structure is displayed in Figure No.2 .

Figure No.1 : Japanese System of Agricultural Insurance 1/



Taken from: Japan Insurance Administration Section Economic Bureau, An Outline of the Agricultural Disaster Compensation System of Japan. April 1979. English Translation made by USAID.

Figure No.2. Israeli System of Agricultural Insurance



The most innovative aspect of the Israeli system is that the marketing and production council funds have an insurance function. They retain part of the risk and pay part of the indemnities to the producers. There are in effect as many insurers as there are funds. The advantage of the system is that losses are first shared among the producers themselves. In the second instance they are shared by the entire organized agricultural sector when the funds are inadequate. Finally, through the special reinsurance account, the entire Israeli society shares the risks of the production of food.

As with the Japanese system, the actuarial experience has been unfavorable with the insurer being kept solvent by government subsidies. Like the Japanese, the Israelis utilize agricultural insurance for broader socio-economics purposes. The goal of the Israeli insurer is very clear and merits citation in its entirety:

Farmer's crops are subject to many natural hazards over which they have no control. As a result of the weather, these crops are totally or partially destroyed, even in good years. In many cases, the loss of a crop results in financial difficulties. When crop failures or heavy losses come in a series of years, financial distress is considerable for those involved. Insurance is a device designed to meet the problem of risks and to give the farmer a solid method of managing his risks. The insurance spreads the losses among many farmers exposed to those risks and over many regions and years. It enables the farmer to substitute payment of a regular annual premium cost for irregular and damaging losses. The farmer has a major investment in his crops. With modern commercial methods of farming, costs are high. Most of the farmers are borrowing money to invest into each year's crop. Loss of that investment often means inability to repay the loans. The insurance improves the credit position of the farmer since it stands as additional security and he uses it to pay off his loans in case of crop failure. Insurance may also be looked upon as stabilizing farmer's income, because it assures their purchasing power every year.

It is wrong to assume that insurance is needed only where losses are frequent, but of little need where losses are infrequent. It is not the frequency of the loss that counts, but the amount and the importance of the amount risked. Where losses are infrequent, the insurance coverage is desirable because it makes the premium cost low. Even in areas of low risk, spot losses and widespread catastrophes, do occur.

The benefits of insurance extend beyond the farmer, since others, also, are dependent upon farm income. If the farmer can repay his loans, his financial position is better and he can spend more money. Agricultural income is a major factor in the national income and any stabilizing instrument as insurance has its effect on the prosperity of the country as a whole.

Crop catastrophes often necessitate Government grants, loans or other forms of assistance to affected farmers. The insurance eliminates the need for such relief measures, which put a heavy burden on the State's budget 1//.

THE UNITED STATES

During the 1930's American farmers, especially those in the Midwest, suffered very severe losses due to drought. Many were forced off the land as a consequence.

One result of these numerous and severe losses was the formation in 1939 of the Federal Crop Insurance Corporation. The results of the first few years of operation were extremely unfavorable due principally to the initial poor design of the insurance. In 1944 the Corporation suspended operations. The following year, 1945, it began to operate once again. In 1949, the basic law was reformed. Since that date the Corporation has operated with an average 97% loss ratio, although, in some years it has reached 250% and in others has been only 30%.

1/ Israeli Fund for Natural Risk in Agriculture Ltd., 1967-1977, Haifa 1977.

The program now covers about 30 crops in about 1/2 of the U.S.'s agricultural counties, but only about 10% of the farmers and 13% of the cultivated land. The insurance is completely voluntary and is of the all-risk yield-guarantee type. The coverage may not exceed 75% of the value of the expected yield nor the amount of direct investment. In most programs, the insured may select between three conversion prices, although most farmers selected the high option.

The corporation receives a small administrative subsidy, but all losses are paid from premium revenues and the reserve. The experience of 30 years has permitted the Corporation to set actuarially sound rates. The minimum premium is 2.8%; the maximum 30%. The crops with the lowest incidence of loss have been rice and other grains; the highest loss ratios have been in potatoes (210%), peas (165%), citrus (158%), grapes (154%), and cotton (150%).

The FCIC has not achieved a larger market basically because of the existence of a competitive, free disaster relief program. The disaster relief program has, however, always been a political program in which organized farmers were able to get cash relief payments based upon political power, not upon the severity of their losses. In 1980, the Congress cancelled the program and channeled the funds through FCIC. From now on, a farmer may purchase the insurance (which will be offered nationally) or run the risk of loss.

CANADA

In Canada the insurance is operated at a provincial level. Beginning in 1958 each province has had the opportunity to inaugurate a program. At the present, eight provinces have begun the insurance. The Federal Government covers 50% of the administrative costs and 25% of the premium. Several

provinces covered the other half of the administrative expenses and between 5% and 25% of the premium^{1/}.

The program is voluntary, all risks (with some exclusions in some provinces; example: fire in Manitoba). The basis of the coverage is the historical output with three coverage levels: 60%, 70%, and 80% at a conversion price set annually. The insurance pays the difference between actual output and the amount set. The provincial programs have had wide acceptance and more than 60% of the eligible farms are insured.

The loss experience of the provinces shows the same behaviour as the system in U.S. The loss ratio fluctuates dramatically from year to year. In 1969, in Ontario, the loss ratio was 157%, and the next year 54%, while in Nova Scotia at the same time, the ratio was the opposite, from 54% to 100%. At national level the loss ratio fluctuates from 20% to 600% in two adjoining provinces, Saskatchewan and British Columbia. In general, the spread of risk is sufficiently broad to enable the system to sustain very high losses in one or more provinces and to generate sufficient premium from the others to pay these losses.

2.3. THE LATIN AMERICAN EXPERIENCE IN AGRICULTURAL INSURANCE

2.3.1. Puerto Rico

The first Latin American experience in agricultural insurance was Puerto Rico which established the Coffee Insurance Program in 1946. The

^{1/} MÜchener RÜchversicherungs-Gesellschaft, München, 1973.

insurer, Farm Insurance of Puerto Rico was created within the Agricultural Development Administration of Puerto Rico in 1966. At the present, the insurance system has insured the following crops: coffee (plants and harvest), bananas, oranges (plants and harvest), vegetables, rice, sugar cane, tobacco curing barns, and poultry structures and equipment.

The insurance is completely voluntary and against any "specific risk," particularly hurricane and windstorm. Several programs such as poultry insurance offer "all risk" cover. The crop insurance premium fluctuates between 2.5% for coffee, citrus trees, and poultry to 10% for bananas and papayas. The deductible is between 5% and 16%. The conversion price is set periodically; also, a free life insurance is included automatic with the policy.

The insurer began with an initial contribution of \$1.0 million through the operations has capitalized a reserve of \$11 millions. In Puerto Rico the reserve is recirculated. The majority of this reserve is lent to the Agricultural Credit Corporation, who lend to the farmers, the majority insured.

The actuarial experience has been very favorable for the majority of the crops insured. In the period 1962-1978, the exceptions have been banana, papaya, tobacco. In total, the loss rate in relation to the collected premiums has been 35%. When the operation costs of 24% are included, the loss rate reaches only a 57%. But, we must remember the Puerto Rico is an island affected by hurricanes once each five years. Catastrophic hurricane losses occur once every 25 years. Thus a very substantial reserve must be created and maintained. Despite this problem, the experience of Farm Insurance of

Puerto Rico has been so positive that the insurer has a commercial reinsurance in spite of the concentration of risks on an island that coverage only 2,000 square miles.

In spite of being an island very exposed to catastrophic risks, Puerto Rico demonstrates that a voluntary insurance system is possible. The cost to the government has been only the initial capital contribution. The premium has always been very moderate. For those considering a specific risk insurance program, especially against catastrophic losses, carefully study of the Puerto Rican program is a must.

2.3.2. Mexico

Mexico began its first agricultural insurance program in the Comarca Lagunera, which has two important crops; cotton and wheat. The farmers of the area established a mutual insurer in 1949. During the following years in the North of Mexico others farmers created mutual insurers to insure commercial crops against fire and hailstorm.

The Central Government organized a Federation of Mutual Insurers under the supervision of Ministry of Finance in 1954 to offer all risk protection. The Federation insured approximately 200,000 farmers and thirty crops. In general the coverage expansion was slow in remote zones.

The Central Government established the Aseguradora Nacional Agrícola y Ganadera (ANAGSA) in December 1961, and its service quickly spread covered approximately 3 millions of farmers and a third of the land in production. Most of the insureds are ejidatarios (collective farmers).

ANAGSA receives a premium subsidy. In addition, the government covers the administrative expenses. In 1977, the total subsidy was of \$50 millions (\$20.50 per insured hectare). This subsidy was adequate to extend \$450 millions of coverage to 3.6 million of hectares and to pay \$73 millions of indemnities.

The Mexican insurance is "all risk" and covers the direct production costs, but by law, the coverage can not exceed 70% of the expected crop value. Mexican insurance is tied to a technological and credit "package". Insured farmers receive adequate production credit and proven technological "package". The insurance is obligatory for farmers using official credit and voluntary for others. The premium is variable by crops, cycles, zones, technology, and tenure. In addition ANAGSA offers a livestock insurance and a peasant life insurance program.

The Mexican system is very complicated in its operation. We can say that the basic purpose is to strengthen and protect the collective farms (ejidatarios) against natural risk. The insurance has functioned as an incentive to collective farmers to adopt and utilize the recommended technology consciously. The collective farm sector produces the majority of the basic grains that the Mexican people consume. The insurance, together with credit and technology, is designed to produce grains, like corn, beans, and wheat, at low price, and to maintain the supply even after losses; when the small farmers' reaction to a loss is to return to the subsistence production and to not take an additional financial risk by borrowing again to engage commercial agriculture

Second, the official agricultural bank in Mexico has always had the problem of periodic descapitalization, particularly after widespread crop losses. The bank needed recapitalization at the moment that the government had to confront a serie of demandssuch as food imports and assistance programs. To balance this fluctuations, the government "bought a policy". The programmed expense of ANAGSA substitutes the financial demands brought about by a bad agricultural year.

2.3.3. Costa Rica

The agricultural insurance in Costa Rica was established in 1969, partially as a result of a seminar presented by IICA in Santiago de Chile. The agricultural insurance began in 1970 as a program of the Instituto Nacional de Seguros, the Costa Rican insurance monopoly. The Costa Rican conceived of insurance as a agricultural development policy. Its specific purposes were:

1. Improve crop production practices
2. Offer a flexible collateral guarantee to the banking system
3. Function as an agricultural sector planning instrument
4. Stabilize farm income
5. Serve as an economic instrument of income redistribution
6. Create an instrument of price stabilization

The financing of the insurance is through the National Banking System which contributes part of the profits. In addition, the National Insurance Institute contributes 75% of its net profits of the technical reserve. In case of deficit, the program can place bonds in the official commercial banks.

The insurance is "all risk" with a coverage that protects the direct investment of the farmer. The insurance is obligatory when a subsidized interest loan is obtained from an official bank.

At official exchange rates the total losses have reached more than \$28 millions with almost \$25 millions in rice. The principal problem is that the program has achieved little diversification. Its principal insured crop is rice. The coverage is concentrated in only one semi-arid province (Guanacaste). At the beginning of the program, the concentration in rice had the purpose of helping the country to become self-sufficient in rice. Costa Rica imported this grain until 1974, but during the period of 1974-1976, Costa Rica exported rice. Then the problem is that someone forgot "to close the subsidy valve" when the goal was reached. Another element that has complicated the Costa Rica's case is that its clients are politically strong and in conditions to protect "their" program and resist realistic premiums.

The Costa Rican program has some very valuable lessons for agricultural insurance. Insurance subsidies should be designed for very specific purpose and they must be taken away the goal has been reached. Likewise, the bad experience should be share by the insured and the insurer so that farmers who report frequent natural disasters pay a bigger portion of the loss every year. Insurers should realize that some risks are not insurable and must be eliminated from the portfolio. Finally in a public insurer, clients can utilize the political system to protect its interests and subsidies. In order to avoid

this problem, it is recommendable that the insurer have the ability to take actions to stop its losses by changing coverages premiums, insured zones, and crops instead of having to request legislation from the Congress.

Fortunately, we can report that the insurer is being restructured in Costa Rica. Recently, some actions have been take to improve the portfolio behaviour through a more realistic premium, and a geographic diversification of the insured crops.

2.3.4. Panamá

The Panamanian insurer, Instituto de Seguro Agropecuario, was established as a government institute in December 1975, and began pilot operations in the 1976-77 agricultural cycle. The institute receives an administrative subsidy from the Panamanian government. The low premiums of 5% - 6% on crops and 2% - 3% on livestock pays the indemnities plus allows a slow capitalization of the reserve. The Panamanian program is "all-risk" crop credit insurance, and is currently offering coverage for rice, sorghum, corn, beans, and canning tomatoes. Its livestock insurance program covers both death and dysfunction. At present about 15,000 head are insured. This new and highly successful program is growing rapidly and should soon become an important sector wide program.

2.4. CONCLUSIONS

Although there are some others interesting insurance systems, especially in Sweden (area yield), Switzerland (private insurance against hail without official participation), and in the Socialist countries, based on the countries reviewed, we can draw some conclusions about the structure and operations of agricultural insurance.

First, in all the systems in the developed countries, the insurance has been established by the government as an agricultural policy instrument. The clearest exposition of the reasons for establishing agricultural insurance was cited from the Israeli insurer's report. Moreover, the insurance has generally operated with an official subsidy to the premium. The exception is U.S., where only the administrative expenses are paid by the U. S. Government. The developed countries have considered the agricultural insurance as a powerful instrument to stabilize farm incomes, to assist farmers to recover after disaster, and to promote exports. One of the more important, but rarely mentioned motives is that insurance functions to prevent an incursion against the treasury at the moment that the government has the least capacity to support it. When a serious disaster occurs the farmers try to utilize the political systems to obtain help. The same disaster is reflected in a decrease in the tax revenues. From the point of view of the government, insurance has two advantages: First, it permits a government to program an annual outlay instead of having to mount an ad hoc disaster relief program. Second, the insurance demands the insured participation in guaranteeing the financial viability of the system.

It has long been argued that agricultural insurance is too expensive for developing countries because of a) periodic catastrophic losses and b) high administrative costs. Neither are necessarily the case. Indemnities

paid from a reserve would in most cases have been used to support a disaster relief program. Most of the administrative costs are already borne by the system in the form of credit supervision, extension and the carrying costs for delinquent loans.

Second, agricultural insurance clearly has a catastrophic loss potential and systems must be designed to sustain these losses. Even in countries like U.S. and Canada with a geographical extension of 3,000 miles, with dozens of insured crops in a highly varied climates, catastrophic losses occur.

In the U.S., the Federal Crop Insurance Corporation has operated with average loss rate has been of 97%. However across the years there are dramatic fluctuations. See Graphic No. 1. For example, the FCIC suffered a loss of more than \$50 millions in 1947 - 1948. In real terms, the FCIC would need a reserve of more than \$ 100 millions to pay this loss today.

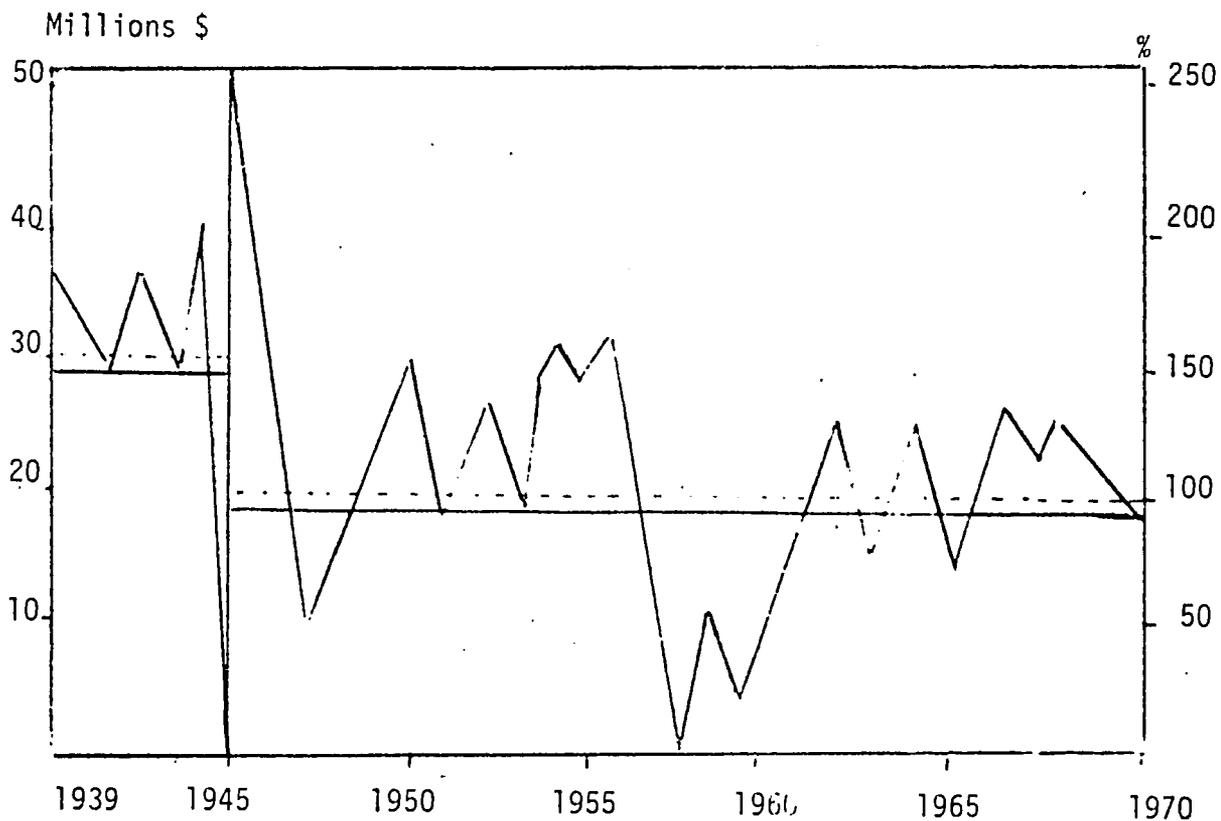
3. THE INSTITUTIONAL STRUCTURE OF AND AGRICULTURAL INSURER

In general, we can say that there are three basic models for an agricultural insurer. Each one with advantages and disadvantages.

3.1. A PUBLIC SECTOR INSURER

An insurer in the public sector has as its purpose the rural development support through the encouragement of the technological and credit programs. The non-profit insurer functions as a contact and coordination point for the Finance and Agriculture Ministries and Rural Credit Bank. Credit, agricultural technology and insurance can be made available as a package and can be designed to support the agricultural policy of the country. The integration of these three elements helps to produce a coherent and consistent agricultural policy. A public sector insurer permits the credit systems to

Graphic No.1. Premium Incomes and Indemnities of the Federal
Crop Insurance Corporation



Premiums (millions \$) -----

Loss Rate Average _____

reach previously marginal groups at acceptable costs for the bank. The insurer, whose principal function is to prevent avoidable losses and to compensate the unavoidable losses, supervises the use of modern technology and facilitates its adoption by relieving the farmer of the financial risk of loss due to adverse weather. The Finance Ministry can utilize the insurer for the fiscal programming. Instead of ad-hoc disaster relief programs, an annual programmed outlay can capitalize the insurer so that its reserve is adequate to indemnify farmer's losses. Moreover, insurance can be used as a policy planning instrument to promote economically or socially desirable options. It can be used for import substitution and export promotion, for example. Finally, a public sector insurer can leverage private sector credit to agriculture. Where the natural risk removed, private sector credit can flow more easily to the agricultural sector. See Figure No.3.

During the course of our work, we have learned that this model is subject to an unanticipated risk. As an official institution, a public sector insurer is subject to a risk that we have called "socio-political risk". This risk to the financial integrity and technical neutrality takes four forms. First, in some cases governments have established insurers that are financially fragile, without adequate reserves and without sufficient premium to capitalize the reserve. Second, in other cases, the political system has obligated the insurers to accept risks that should not insured without providing additional capital to maintain the solvency of the insurer. Third, in some other cases, the insurer has received orders "from the top" to pay unjustified claims. Fourth, the manager has been named based upon his political affiliation and not his competence and experience in insurance. In order to avoid these problems, we decided to investigate the possibility of placing the insurer in the private sector. Rapidly our investigations carry us to conclude that it is very unlikely that a private sector insurer would have a significant developmental impact.

3.2. A PRIVATE SECTOR INSURER

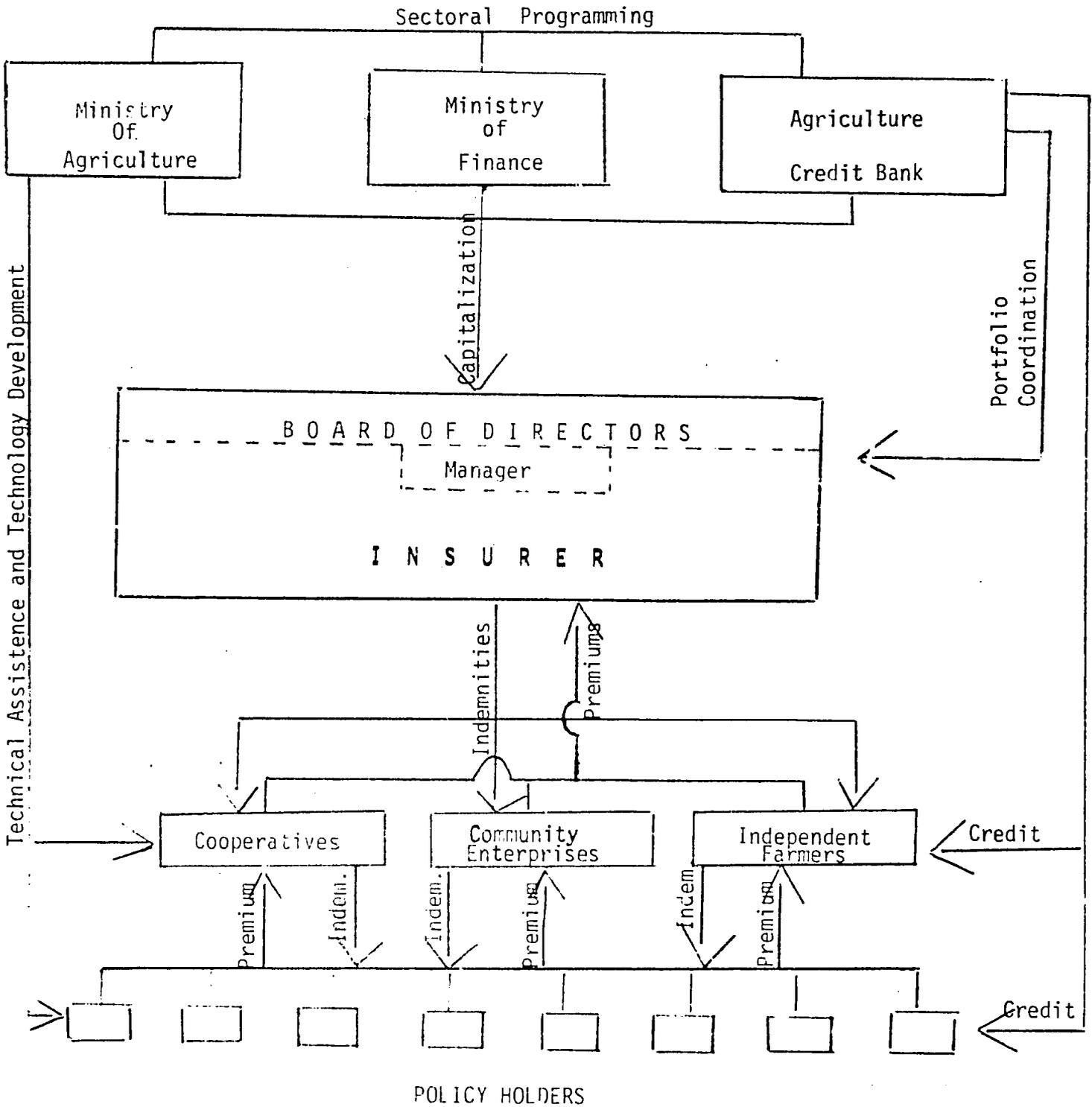
An insurer in the private sector has as a purpose the profits in its risk acceptance and its investments. Private sector insurers must exercise very careful judgements in accepting risks and must set a premium to capitalize a reserve and to show a profit. Normally these insurers take the best risks; in the professional terminology, "skim the cream". Likewise, private sector insurers are seldom able to offer "all risk" cover because of the lack of an adequate reserve for catastrophic losses. Most private sector insurers offer only hail coverage. The expansion of a private sector insurer is very slow because of the necessity to create a catastrophic loss reserve. It is most unlikely that it would ever be able to offer insurance to more than a small part of the farmers; even those insured would most likely be insured on a limited risk basis such as hail and fire insurance.

At present, the historic experience is not very positive and shows that the private insurers that continue operating are small with a few clients, and less coverage. From the development point of view, we can say that the impact of private sector agricultural insurance has been very marginal. Finally most have gone bankrupt leaving the insureds with policies of no value at the moment of greatest need.

3.3. A MIXED CAPITAL INSURER

A mixed capital insurer offers a solution to the two basic problems: the slow capitalization of a private insurer and a socio-political risks a public insurer. We have developed an administrative model that we are implementing in Ecuador which offers a solution to these problems. (See Figure No.4).

Figure No.3. Agricultural Insurance in the Public Sector



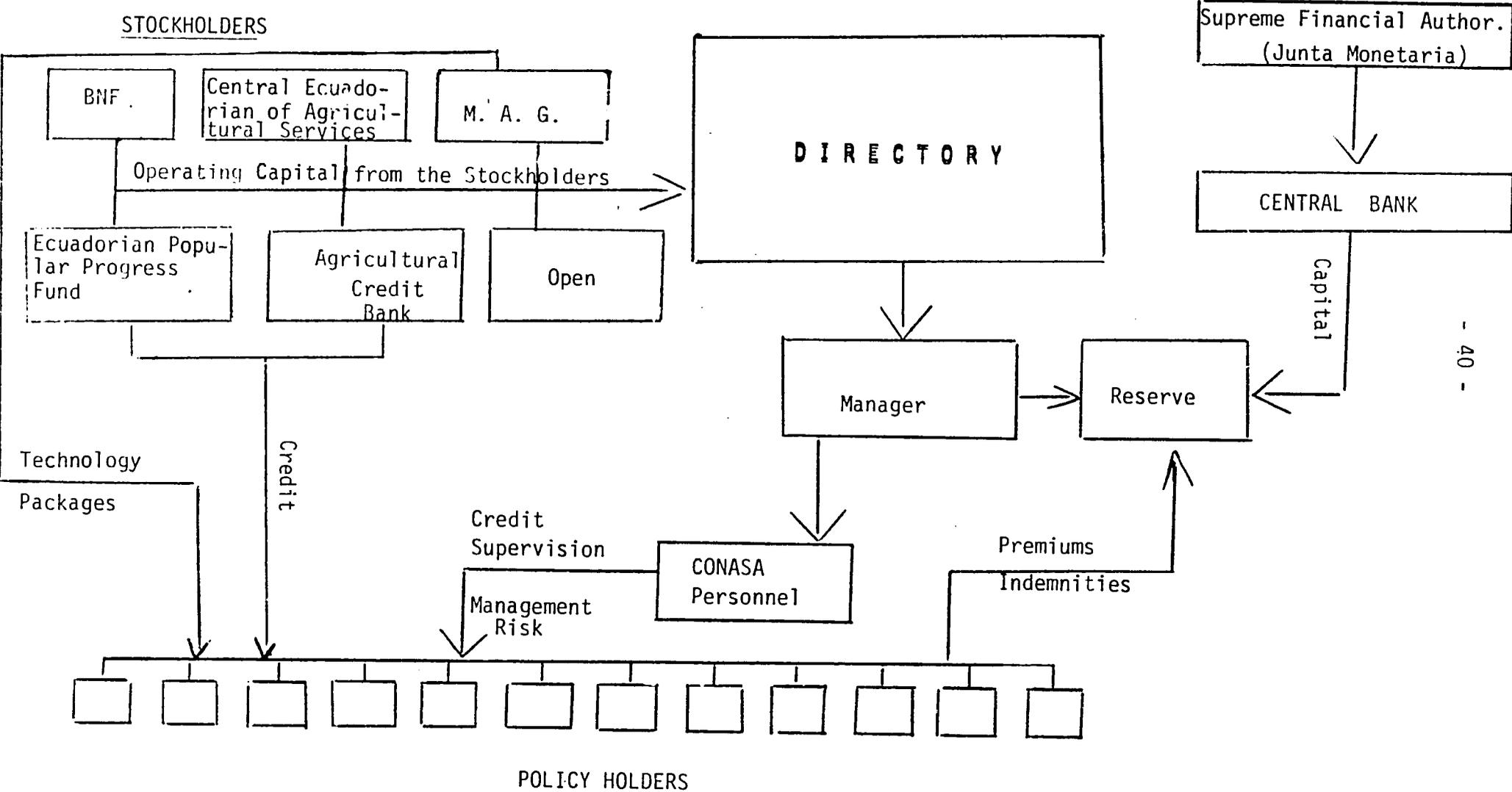
The insurer is a mixed capital enterprise in which the two sectors, public and private, participate. The majority of the capital is provided by the government, but on the board of directors the government has approximately 50% of the votes. The insurer's structure is opened to the entry of other institutions that wish to put in capital and participate in the management of the insurer, (see Figure 4). This model is not new; in essence it is a modification of the English syndicates of the XVIII Century. The initial members in Ecuador are: Banco Nacional de Fomento (National Development Bank), Ministerio de Agricultura y Ganadería (Agricultural Ministry), Central Ecuatoriana de Servicios Agrícolas (Ecuadorian Agricultural Services), Caja de Crédito Agrícola y Ganadero (Livestock and Agricultural Credit Fund), and Fondo Ecuatoriano Populorum Progressio (Ecuadorian Popular Progress Fund). Additionally, others institutions have expressed their interest in becoming stockholders in the institution and thus, obtaining insurance for their members.

The advantage of this model is that it is an open ended. Any group can apply to purchase capital. The individual farmers can always request for the insurance but without participation in the board of directors. The addition of new members to the board permits the insurer's capital to be increased so that the insurer can expand its coverage and still maintain a favorable writings - to reserves ratio. As new members are added to the board and as the capital increases, the official participation declines from a majority to a minority position. The advantages of this structure are: First, the insurer has its own capital and has to protect it as does any other insurer. Second, the insurer functions as an instrument of the agricultural sector policy but at the same time, the structure of the board helps to protect the insurer against unadvisable, politically motivated decisions.

Before leaving the institutional organization theme, it is perhaps wise

to note that no single structure is best for all time and places and that none guarantees success. Insurance by its nature is risky. The technology of agricultural insurance is very complicated; it is experimental at present. The development of the agricultural insurance systems is a slow and cumulative process. It is very probable that some insurers will fail. The mistakes and successes must be our teachers. We are traversing unknown terrain without maps. We are convinced that agricultural insurance is a contribution to agricultural development and that is administratively and financially feasible. We have to begin with pilot programs and learn from the experience of these institutions. A popular proverb holds that "The person who do not walk, has a little risk of falling". Equally, we must begin with insurers, but we must learn gradually to do the agricultural insurance.

Figure No.4 The Ecuadorian National Agricultural Insurance Company, S.A. (CONASA)



ENTREPRENEURIAL IMPACT OF FARMER'S PERCEPTION OF AGRICULTURAL INSURANCE

Dr. Carlisle A. Pemberton*

*Lecturer, Department of Agricultural Economics and Farm Management, University of West Indies, St. Augustine, Trinidad.

4. ENTREPRENEURIAL IMPACT OF FARMER'S PERCEPTION OF AGRICULTURAL INSURANCE

4.1. Introduction

Agricultural insurance is being considered in many parts of the developing world as an useful device to reduce the impact of risk on the operations of farmers. Quite rightly much attention has been placed on the necessarily organizational structure and the problems associated with the implementation of such programmes. Much less attention has been placed on farmers themselves in the whole realm of agricultural insurance. Largely it has been assumed that farmers would realize the benefits of agricultural insurance and adopt its use or that in the compulsory schemes associated with say credit use, that the farmers would be forced into an appreciation of its benefits.

This paper is concerned with the effect that agricultural insurance can have on the managerial approach of farmers especially the effects of such insurance on entrepreneurship in farming. In the present context entrepreneurship is taken to mean a positive approach to organizing a business undertaking by taking all measures necessary to the attainment of the highest levels of technical and economic efficiency.

The contention of this presentation is that agricultural insurance will only have a beneficial impact on entrepreneurship if farmers perceive the insurance scheme in a particular context. This context one can argue would only be created if the insurance scheme has certain desirable characteristics. Some of these characteristics will be suggested in the development of the paper. The discussion is presented with particular respect to the situation in Trinidad and Tobago.

4. 2. A THEORY OF THE DECISION BEHAVIOUR OF FARMERS

One of the key functions to the farmers in his managerial role is the making of decisions. On the farm these decisions generally involve choices among production alternatives, marketing alternatives, investment alternatives, and financial alternatives. It is largely by the decisions that the farmer makes that he can demonstrate entrepreneurship.

The process by which farm decisions are made will be explored briefly since it will help to guide the subsequent arguments: The farmer is assumed to have one or more goals which he (or she) seeks to attain. By assigning weights to the goals the farmer can incorporated them into an utility or goal function.

To avoid the process of goal attainment, the individual sets for each goal some mentally perceived value which becomes the level of aspiration associated with the goal. The level of aspiration is the level of goal attainment the farmer believes could achieved if all factors were in his favour. He therefore, strives to attain this level.

The farmer is however, aware of the risk (and uncertainty) associated with the decision environment. He therefore, subjectively discounts his

expectations of the level of achievement and does not normally expect to attain the levels set by his aspirations. His level of expectation will thus be below his level of aspiration, the difference in levels being his degree of risk aversion or his risk premium.

When the farmer is faced with a choice between alternatives, he assesses the relative contribution of each alternative to the goals in his utility function. His decision is made by obtaining the alternative or combination of alternatives which make the greatest contribution to his total expected utility. It should be borne in mind, however, that his levels of aspiration set the maximum levels that he considers attainable for his goals and that he normally will not expect to attain the levels of aspiration.

If risk and uncertainty elements are unfavourable resulting in actual goal attainment below the levels of expectation, this may in the first instance lead to a lowering of the levels of aspiration of the individual as well as search behaviour for alternatives which may allow him to achieve his expectations^{1/}. Further failure will usually lead to

^{1/} In large measure in Trinidad and Tobago context such searches may lead to off farm occupations for the farmers.

a lowering of expectation levels to positions that the farmer thinks may be achieved, given a more reasoned estimation of his situation.

Extended periods of failure to achieve his levels of expectation even with downward adjustments to expectation and aspiration levels may lead to psychological reactions on the part of the farmer, especially in the form of frustration or apathy. In these states the goal achievement mechanism of the individual becomes impaired. There is then little desire for achievement or accomplishment and the farmer may become concerned only with bare existence or survival. In such a state decisions on the farm will not reflect any innovativeness and investment will not be favoured. In general, entrepreneurship will be lacking.

If risk and uncertainty factors are favourable resulting in actual goal attainment at or above levels of expectation, this will normally lead to higher levels of aspiration and expectation on the part of the farmer. The higher level of aspiration facilitates improved performance by the farmer, since it improves his disposition for improvement and progress. Repeated success in meeting or exceeding expectations can lead to decreased risk aversion by the farmer. These consequences should in general favour improved entrepreneurial performance by the farmers.

4.3. RELATIONSHIP BETWEEN FARMERS' BEHAVIOUR AND AGRICULTURAL INSURANCE

The question that arises at this stage is what relationship exist between agricultural insurance and the behaviour of the farmer as just described.

Participation in an agricultural insurance scheme by a farmer should have a direct effect on his levels of expectation and aspiration. The farmer would be spared the possibility of severe hardship resulting from adverse returns from failures to achieve expectation levels, the availability of indemnity payments should prevent their levels of aspiration from reaching such low levels that adverse psychological reactions should occur. Such psychological reactions would tend to occur mainly among low income or subsistence oriented farmers. Therefore, major benefits of an agricultural insurance scheme could be derived if such farmers are able to maintain the motivation necessary for an improved existence through farming.

In low income and subsistence oriented farming systems, adverse conditions caused by uncertainty elements may lead to decisions to decrease the level of family consumption or the partial liquidation of assets. The effect of indemnity payments from an agricultural insurance scheme would be to assure the farmer of some minimum level of income. This income may enable the farmer to maintain family consumption levels even under the most uncertain conditions, with a concomitant maintenance of nutritional levels, family social welfare and a more viable farm labour supply. Especially in developing societies, these benefits of agricultural insurance would be most desirable.

Under more commercially oriented farming systems, the effect of agricultural insurance may be to raise the levels of expectation which may lead to narrowing of the risk premium of the farmer. This result should follow, since the farmer would be spared the possibility of severe

hardships from the effects of unfavourable conditions. A less risk adverse farmer should tend to favour decisions leading to innovativeness and the use of improved technology on the farm. Such decisions facilitate greater efficiency of resource use.

Better on-farm efficiency would normally lead to higher levels of farm income and farm growth. If these higher levels of farm income are on par with or exceed the expectation levels of the farmers, a "pleasant cycle" could be set in motion. Success leading to higher levels of aspiration, leading to higher level of expectation, greater striving to achieve those higher aspiration levels, and consequently higher levels of achievement or success and so on.

Entrepreneurship flourishes under such conditions. The "pleasant cycle" would be facilitated by decisions favouring investment and the use of credit on the farm. An agricultural insurance scheme, since it will tend to stabilize the liquidity position of the farmer, would contribute directly to the creation of an environment for making such decisions.

4.4. FARMERS' PERCEPTION OF AGRICULTURAL INSURANCE

The final concern of this paper is the context in which farmers must view agricultural insurance for the benefits just outlined to be realized.

The first issue here is that the farmer must believe that he has obtained coverage for all risks relevant to the management of the farm. This is necessary since farmers tend to take a holistic view of

farming and matters related to it. If the farmer has coverage for say the risk of fire, and flooding is major risk concern of his, then the fire insurance (in and of itself) cannot be expected to increase the level of expectation of the farmer for higher income (if this is his goal in farming).

The view is therefore, held that any agricultural insurance scheme should attempt to encompass all risks that affect the entrepreneurial performance of the farmers.

The second issue is that farmers must perceive that the insurance scheme is not a tax measure by the central government. Farmers must be convinced that the insurance is to cover their risks in farming so that premiums are related to the risks being covered and that benefits or indemnity payments will reflect the extent of the damage incurred. Only if it is perceived in this way will insurance bring about the reduction in the risk burden that the farmer believes that he is bearing and it is the reduction in this risk burden which will give impetus to his entrepreneurship.

In this regard, the administrative costs of the schemes should be kept to a minimum, so that premiums are also kept a minimum. Any agricultural insurance scheme should not become viewed as a source of employment, especially for urban folk. I think that it is very unfortunate when the word "insurance" is associated with taxation or social security schemes.

Closely related to this issue of taxation is that of equity. Farmers must be assured that agricultural insurance will not lead to a

worsening of their position in relation to the rest of society. In other words, the investment of premiums of the insurance scheme should as far as possible be within the rural sector or at any rate in measures that benefit the rural sector of the economy.

The fourth issue is that, if farmers perceive that the insurance scheme is merely an institution to provide loans or grants, to farmers by government in the nature of disaster relief, then it is difficult to see such a scheme having the effect of reducing the risk burden facing the farmer. In particular, a disaster relief scheme is particularly dependent on the classification of disasters. Normally a large dosage of political considerations underlie the definition of a disaster and since the farmers would normally have paid no premiums they are in a poor bargaining position to convince the political authorities of their need for relief payment. The obtaining of disaster relief then becomes a risk in itself.

It may be concluded that for agricultural insurance to have its greatest impact on entrepreneurship the insurance scheme must be perceived by the farmer as a commercially oriented "no-nonsense" business enterprise with secured long term viability. In particular farmers have to realize that: if they have insurance coverage and they have a loss, they would get an indemnity payment; if they have no coverage, and they sustain a loss, no payment is possible; if they have coverage and they sustain no loss, no payment is possible. The scheme must be viewed as an insurance not a subsidy scheme. In this regard the scheme should be well attuned to local conditions and needs. In particular, higher premiums should be charged in areas where risks are greater. As much as possible the scheme

should avoid charging the same levels of premiums on a nationwide basis. If this nationwide sameness of premiums is practiced, farmers who suffer infrequent losses would feel that they are subsidizing other more risk prone farmers with little likelihood of their ever receiving benefits. Under these conditions the insurance would not have a stimulating effect on such aggrieved individuals; they may even willingly sustain losses just to receive some of the money they believe they have invested in the insurance scheme.

With respect to long term viability if there is some doubt of the viability of the scheme then to participants in the scheme this will be a new source of risk, whether if damages do occur they will in fact get indemnity payment. This of course, is undesirable. Some state collaboration in the formation or guaranteeing of an Agricultural Insurance scheme would thus be desirable to eliminate this source of negative perception on the part of farmers.