

INSURANCE OF CROPS – A FRESH LOOK

Key Introductory Points

First, and basic to the understanding of insurance, is the reality that insurance does not and cannot obliterate risk. It spreads risk. There are two dimensions to this spread. The first dimension is the spread across an industry or an economy, extended in the case of international reinsurance to the international sphere. The second dimension of spread is through time. Most insurance programmes operate on both dimensions. The important fact to note is that insurance does not directly increase a grower's income. It merely helps manage risks to this income.

Second, insurance is a business. An insurance indemnity only becomes payable in the event of a claim under a policy. The policy must be in force, with premium paid, by the time of the loss event. Most policies incorporate an element of risk sharing, by means of a deductible (also known as an 'excess'). This amount is the percentage of the loss which is borne entirely by the insured.

Third, premiums must cover several areas of cost in addition to meeting the cost of paying indemnities under policies in force.

The Business of Insurance

In any business arrangement, both sides of the transaction must expect to benefit. Crop insurance transactions are no different. This defines the first boundary: **crop insurance is sold and bought in a market**. The purchasers must perceive that the premiums and expected benefits offer value; the sellers must see opportunity for a positive actuarial outcome, over time, and profit.

Crop insurance is not the universal solution to the risk and uncertainties which are part and parcel of farming. Rather insurance can address part of the losses resulting from some perils. The second boundary then is, **insurance has a limited role in risk management in farming**.

The third boundary is that any limitations to the scope for **effective and economic crop insurance**, though real at any given moment, **can change over time**. Farming enterprises and systems are dynamic. They change over time, and in so doing present different patterns of risk and new ways by which farming technology, and farm management techniques, can cope with production and other risks. The design of insurance solutions is an equally dynamic field of research and development. New techniques of ascertaining that loss-causing perils have occurred, together with more efficient and economical methods for measuring losses, mean that new types of insurance products can be developed. When companies see a business opportunity here, with an evident demand, then these products will be refined, funded and marketed.

Crop Insurance Today – the Global Picture

The total annual agricultural and forestry insurance premiums, worldwide, in 2001 amounted to some \$6.5bn. Of this amount 70 percent is accounted for by crop and forestry products. This sum must be compared with the estimated total farm gate value of agricultural production globally, which is \$1,400bn. In this case the insurance premiums paid represent just 0.4 percent of this total.

Geographically these insurance premiums are concentrated in developed farming and forestry regions, i.e. in North America (55 percent), Western Europe (29 percent), Australia and New Zealand (3 percent). Latin America and Asia account for 4 percent each, Central/Eastern Europe 3 percent and Africa just 2 percent.

These figures present a snapshot view of agricultural and crop insurance. A dynamic rather than static view indicates a changing situation. Agricultural insurance is a growth business area. This growth is driven not only by the increasing commercialism of agriculture and the availability of new types of insurance products, but also by international trade policy developments.

Growth in demand for crop insurance products

The expected growth in demand has its origins in changes in the farming sector. Powerful influences can be summarized as:

- a. Evidence is accumulating of connections between climate change, and the increasing incidence of **crop damaging weather events** of extreme severity.
- b. Farming is becoming steadily more **commercialised**, with greater levels of financial investment. Farmer/investors and their **banks** will frequently examine the feasibility of using a **financial mechanism** i.e. insurance, in order to address part of the risk to their financial investment. As a part of this trend to commercialisation greater use is now being made of **contract farming** arrangements, where insurance is one of many services provided, along with inputs, to growers. In summary, there is a trend to formalise risk management in farming, with insurance being one obvious mechanism which can be harnessed for this task.
- c. The **World Trade Organization (WTO) regulations** generally forbid governments from subsidizing agriculture directly; however, they permit the subsidization of agricultural insurance premiums. For those countries wanting and able to effect transfer payments into their farming sectors, insurance provides a convenient channel for doing so. In the face of this WTO regulation, it is clear that demand for crop insurance will increase in those economies that wish to implement a policy of permitted subsidization of their farmers.

- d. The dynamism of the farming sector, and its environment, is reflected in developments in the design of **new insurance products**. In the last decade two types of new products have been introduced. In some cases these have partially displaced existing covers; in others they have resulted in demand from new clients. The products are firstly, Crop Revenue products, secondly, Index or Derivative products.
- e. **Accidental introduction of exotic pests/diseases** is something which concerns all countries where agriculture is an important part of the economy. Insurance can address the risk of a breakdown of these measures.
- f. Insurance can also assist in managing the on-farm production risks consequent to changes in pest management practices. Such changes are increasingly required in order to address **environmental protection** and **food safety** concerns.

Many of these apparently diverse influences have a major common theme. This is that any insurance arrangement will involve not only the farmer and the insurer, but also important third parties. Consideration is now given to these changes to the business of farming, and to how they have increased demand for crop insurance, or might be expected to do so in the future.

Two fairly new products warrant brief descriptions. These are (i) products based on insuring a level of crop revenue, and (ii) products where insurable damage is determined in the basis of an index derived from data external to the insured farm itself.

Crop-Revenue Insurance Products

The essence of this product is to combine production and price risk, the combination of production and price being the determinants of gross revenue from a given crop. Under normal supply/demand conditions a production shortfall might be expected to result in a rise in price. To some extent such a rise will cancel out the financial loss for the grower who suffers a production shortfall. But this will only be the case if he harvests sufficient crop and sells it at sufficient premium over the expected price. Crop-revenue insurance is designed to meet any remaining shortfall in revenue from crop sales. Frequently, too, crop-revenue products involve the determination of loss on an area basis, introducing important economies in the loss assessment process.

At present crop-revenue products are marketed mainly in North America, where they first became available to all corn and soybean growers in Iowa and Nebraska in 1996. Here their use is facilitated by commodity markets being highly developed and by related information being reliable and readily available. In this connection it is important that the price element of the policy be market based, that is, on futures prices for the coming season. The alternative, to use some sort of target price, could lead to a distortion of supply. Furthermore, it is unlikely that a crop revenue product based on a target (i.e. non-market price) would find underwriting support.

Crop-revenue products have spread beyond North America. The extent to which they could apply to developing countries will depend on the development of local crop futures markets, as well as on the availability of the necessary local expertise. However, these changes are really only a matter of time. Given the advantages to the grower and to the insurer, this type of insurance product is likely to grow in importance, though for smaller crop areas, as with yield assurance, it will always suffer from the problem of high administrative cost per unit of value.

The crop revenue approach follows from a new trend in agricultural insurance. This is to define the **insurable interest** as an income stream rather than as the intrinsic value (or expected value) of the biological item at risk. This redefinition leads readily to a consideration of farm loan and insurance linkages, since the servicing of interest and principal payments on an agricultural loan depend on the income stream produced. Some crop insurance programmes have been administratively arranged so that the insurance element is made a part of the loan, with the bank being the first recipient of any indemnity paid by the insurer, while the premium is a working capital item that is packaged with the loan itself.

A more recent development is that some banks are believed to be interested in direct coverage of portions of their loan portfolios, more particularly for catastrophic losses following a systemic peril.

Index-based Insurance Products

In a classic crop insurance policy, evidence of damage to the actual crop on the farm, or in the area of the farm, is needed before an indemnity is paid. But verifying that such damage has occurred is expensive, and making an accurate measurement of the loss on each individual insured farm is even more costly.

An index (also known as ‘coupon’) policy operates differently. With an index policy a meteorological measurement is used as the trigger for indemnity payments. These damaging weather events might be:

- a. a certain minimum temperature for a minimum period of time
- b. a certain amount of rainfall in a certain time period – this can be used for excess rain and also for lack of rain (drought) cover
- c. attainment of a certain wind speed – for hurricane insurance

The classic insurance policy is replaced with a simple coupon. Instead of the usual policy wording, which would give the indemnity, or range of indemnity levels, on say a per hectare basis for a given crop, for losses from specific causes, the coupon merely gives a monetary sum which becomes payable on certification that the named weather event, of specified severity, has occurred. The face value of the coupon may be standard, to be triggered once the weather event has taken place for the area covered. Alternatively it could be graduated, with the value of the coupon then being proportional to the severity of the event.

Clearly this type of trigger operates over an area, encompassing many insured farms. Again, a trigger such as this cannot be used for certain perils, such as hail, where the adverse event normally impacts on a very limited area of land. On the other hand, it is suited to weather perils which impact over a wide area, for example drought.

Since there is no direct connection between a farming operation and the coupon, even those without crops at risk could theoretically purchase risk cover of this type. This is not a disadvantage. On the contrary, there are many persons besides farmers who stand to suffer financial losses from adverse weather events.

Despite the paucity of experience with index insurance, there is a high level of interest in both development and insurance circles in this risk management mechanism for developing countries. This interest is prompted by the belief that index insurance products offer an apparently practical solution to many of the barriers to classic crop insurance for small-scale, dispersed farmers in less developed areas of the world. These barriers include:

- a. adverse selection – only those farmers more at risk will buy cover
- b. moral hazard – the insured farmer may not do everything possible to avoid or minimise a loss
- c. transactions costs – the huge costs of marketing individual insurance policies, coupled with the administrative costs involved in calculating and collecting individual premiums and paying claims
- d. loss assessment expenses – if loss assessment is done on an individual farm basis the costs can be very large in comparison to the premium paid.

Steps in the development process

Any decision-making process on crop insurance involves many stages. These stages and certainly the priorities will differ, depending on which type of body is doing the investigation. This may be a government ministry, a farmers' organization, an insurer, a bank or a group of marketing/processing agencies. In any case, some of the more important issues and steps are:

- a. Demand assessment – ensuring that any initiatives are in response to real risk management needs
- b. Identification of the key insured parties; automatic or voluntary cover?
- c. Determination of key perils – a key factor in insurance design
- d. Decision on crops to be covered – another key factor in insurance design
- e. Analysis of insurance options, administrative models and loss assessment procedures, together with determination of associated costs
- f. Rating – determining the pure premium required, plus administrative and loss adjustment overheads to derive the initial premium level to be charged
- g. Identifying possible complementary roles for the government and for the private sector

In any given situation the results of investigating these issues will determine whether or not crop insurance is the most efficient and effective mechanism to manage a particular area of risk. The results will also indicate the type of insurance product which is optimum for a given situation.

As with most assets or production processes, virtually any crop can be insured, against virtually any peril, but only at a price. With squeezed profit margins on the production of many crop commodities, a paradoxical situation arises. The tight margins highlight the need for risk management, including insurance, but also reduce the ability of growers to buy the desired level of protection.

The management of insurance, as a business, has several stages. These are: market identification; product development, marketing, setting indemnity and premium levels, collecting premiums, handling claims. The over-riding aim in the design of administrative structures and procedures is to lay a foundation for minimising costs. Since the potential clientele comprises small and often widely dispersed growers, costs can easily escalate to the point of non-viability of the business, unless special care is taken. In this connection, the new insurance products, mentioned earlier, offer much scope for drastically lowering the costs of administering a financial risk management mechanism.

The extent of involvement of the public sector varies from country to country, but it always has a role, even if this is exercised in the main through setting supportive and regulatory policies. It may be particularly important in the early stages of developing crop insurance, and in situations where financial support is considered both desirable and possible.

Buying insurance involves increasing the up-front costs for a grower. The advantages of buying cover must be clear, with careful positioning of any proposed insurance product. Firstly, this means recognising that insurance as such may not have a legitimate role in a particular industry for the major perils, as seen by the owners. Secondly, where there is believed to be a role, it means that careful attention must be paid to benefit/cost considerations for both contracting parties – the insured and the insurer. These two conditions can best be met by identifying the real points of financial risk in an enterprise type, and examining whether a financial risk-sharing mechanism can be economically applied. In general, the more commercial the operation, the more likely is it that insurance could be designed to address certain of the risks involved. This applies, in particular, to the intended market for the produce of the grower. A formal, commercial market implies the ability to collect information on quantities of production from particular growers. Time series data of this type, since they are based on transactions involving payment, is likely to be highly accurate. A market outlet may also facilitate administrative economies in arranging the cover, or even in paying premiums.

Once the administrative business structure is in place, attention must be given to developing a product or line of products to meet the already identified demand. It is at the stage of product development that it is necessary to identify the point at which insurance

could most economically impact on and contribute to growers' risk management strategies.

Whereas each industry will have its own special features, problems and opportunities, one general point can be made. Product development is a highly skilled task, requiring both detailed knowledge of farming and/or forestry, coupled with a sound appreciation of the principles and operational imperatives of insurance. As such, this can be an expensive stage in the process, and one with which international agencies can often assist. This assistance might be in the form of direct partnership in product design, or training existing insurance staff to handle the new challenges. In practice it is likely to start with both approaches. What is important to note is that the design of insurance products, like the design of products for other financial services, is an ongoing task.

Implicit in any moves to start crop insurance is the assumption that there is a demand for the product. Whereas automatic insurance has many advantages, it is not always possible to design this type of policy. Marketing therefore is important. Several factors are important here:

- a) Close links with the representatives of farmers and foresters, and speedy response to new needs for insurance.
- b) Similar linkages with banks, farm product buyers and others with business connections with insured growers. The possibility of insurance being rolled into a seasonal cropping loan has already been mentioned. In this type of arrangement the marketing is automatic, at very low cost.
- c) Attention to appropriate publicity.
- d) Scrupulous fairness in loss assessment and claims handling.
- e) Speedy payment of claims.

In standard, traditional insurance, the basic issue to be addressed is whether the insurance is meant to substitute for farm income in the event of a loss event, or whether the indemnity would merely cover the cost of inputs lost, because of crop damage. The second option is certainly the easier and lower cost alternative, as the level of overall coverage would be significantly less.

With index policies the choice would be more flexible, since an insured individual could choose the level of coverage, purchasing the number of units which suits his or her needs.

In any case, it is vital that an actuarial balance is struck between premium and indemnity levels, and that this balance be continually checked in order to ensure the financial sustainability of the programme, and its ability to meet commitments to insured growers. A key issue is the level of deductible (excess) which applies. The effect is twofold. Firstly, and more obviously it impacts directly on the premium level through an inverse relationship between the quantum of deductible and the pure premium required for a given level of insurance protection. Secondly, it also impacts through economies in

loss assessment and adjustment costs, a deductible means that minor losses will not prompt a claim, and therefore no loss assessment will take place.

A major area of difficulty in setting indemnity and premium levels is the lack of data linking the incidence of adverse weather events and actual losses in the field. In any case, insurance products in agriculture are seldom launched on the basis of all the data an actuary would wish to have in order to set premiums at the level required to meet expected indemnity liabilities. Experience must be gained during the early years of a programme. During this period adjustments can be made to the indemnity and premium levels, and also to the percentage of deductible applied.

The main objective here is to keep costs as low as possible, so there is a strong incentive to build linkages with existing providers of services to the farm and forestry sector. Perhaps the most obvious linkage is between the insurer and banks serving the same clientele, with the loan included as a component of the seasonal cropping expenses. Since the premiums in such cases are paid in bulk by the banks to the insurer, costs are minimized.

Roles for Government and the Private Sector

Whereas, as a business, insurance belongs in a business setting, the very nature of crop and forestry insurance means that there is bound to be strong governmental involvement. Most governments have a close interest in risk management in agriculture, both for productivity reasons, and concern for the wellbeing of rural populations. This often means, in practice, that governments are active not only in an overall policy sense, but can be more intimately involved in various ways. These can range from initial investigation of the feasibility of introducing crop and/or forestry insurance products, leading to eventual promotion, and even financial participation.

At the same time, and as stated above, there are strong reasons for the business operations in insurance to be handled by a commercial concern, for reasons of efficiency and convenience in terms of insurance operations complementing other commercially-run services to farming.

This dual parentage of crop insurance can lead to tensions. The most crucial areas of concern lie in the areas of premium setting and claims handling. In these areas experience has shown that undue and inappropriate political influence on an insurer can be very damaging.

Accordingly, much attention is given during the design of crop insurance programmes to avoiding these tensions to the extent possible. Such avoidance is aimed at optimising the role of the public sector, while harnessing the drive and efficiency of the private industry sector.

Several steps are involved. One listing might suggest the following as important:

- a) Ensure that any existing company or new entity has a sound legal basis on which to offer insurance products, with the required level of business competence.
- b) Clarify the government's objective in promoting crop insurance. Is it purely an additional risk management mechanism, or is it also an avenue of subsidy to the farming sector? If the latter is the case, then the avenue for financial support has to be ring-fenced from day-to-day political interference. This is not easily done, yet it is essential if there is to be the required continuity of financial conditions in order to build efficiency and fairness into the system.
- c) Establish strong linkages, at an early stage, with international re-insurers. These companies can assist not only with technical advice, but can also be instrumental in ensuring the necessary adherence to correct application of premium setting procedures, and settlement of claims. Although the opportunity for profit may be some years away, such companies are often prepared to become involved in a new geographical field of business. They operate with long term time horizons, and this can work very much to the benefit of a nascent crop insurer – whether this is a new company or a new section within an established company.
- d) The financial base for the insurer must be adequate. This must be sufficient to survive initial years in which weather conditions might be such that underwriting profits are sharply negative. On top of this loss, administrative expenses have to be met. In many developing countries there may have to be public sector participation in ensuring a sound financial base.
- e) Work closely with representatives of the farming and/or forestry sectors. This will help ensure that the service and products are popular and therefore in demand.