



STUDY NOTE - 9

RISK INSURANCE

This Study Note includes:

- **Insurance, insurability of risk and insurance contracts**
- **Risk analysis**
- **Insurance industry**
- **Insurance products**
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INSURANCE, INSURABILITY OF RISK AND INSURANCE CONTRACTS

Insurance can be defined as transferring or lifting of risk from one individual to a group and sharing of losses on an equitable basis by all members of the group. In legal terms insurance is a contract (policy) in which one party (insurer) agrees to compensate another party (insured) of its losses for a consideration (premium). Exposure to loss is the insured's possibility of loss.

Insurance is a means whereby a large number of people agree to share the loss which a few of them are likely to incur in the future. Insurance is also a means for handling risk. There is an uncertainty related to the risk. The business of Insurance is related to the protection of the economic value of any asset. So, every asset that has a value needs to be insured. Both tangible goods and intangibles can be insured.

Requirements of an insurance contract

Four requirements are laid down for a valid insurance contract as below:

Agreement must be for a legal purpose, i.e., the contract of Insurance should not violate the principle of Insurable Interest and it is a contract of Uberrimae Faide (Utmost Good Faith)

Parties must have legal capacity to contract; Minors, Lunatics, Insolvents, Intoxicated persons, etc. do not have the legal capacity and cannot enter into an insurance contract

There should be a **valid offer** and **acceptance** and

There must be **exchange of consideration** in response to an agreement which defines the quantum of possible loss to the insured. The premium amount is paid by the Insured by way



of consideration on the basis of the policy risk insured. The Insurer's consideration will be a promise to indemnify the loss of the insured on the occurrence of the insured's risk.

Characteristics of insurance contract

Following are the unique characteristics which are distinct from other forms of contract.

- **Aleatory contract (Dependent on chance):** The values exchanged by the contracting parties in an insurance contract are unequal as they are dependent on chance or in other words in an insurance contract result depends entirely as risk. If the loss arises, compensation is paid by the Insurer on the occurrence of peril. If it doesn't occur insurer does not pay any compensation while the premium gets paid to the insurer. The question of paying compensation does not arise.
- **Conditional Contract:** Insurance contracts lay down conditions like providing proof of insurable interest, immediate communication of loss, proof of loss, and payment of premium by the insured
- **Contract of Adhesion:** Legally obligatory on the part of the insurer to explain the terms of contract fully to all the parties. This is particularly important as under contract of adhesion, any ambiguity in the wording of the agreement will be interpreted against the insurer as he had laid down the terms
- **Unilateral Contract:** Insurer is the only party to the contract who makes promises that can be legally enforced.

Generally, Non life insurance contracts are usually annual contracts and have to be renewed each year. Each time the policy is renewed a new contract is issued by the Insurer.

Rights and responsibilities of insurer

The Insurer has the right to collect the premium from the Insured and also lay down conditions to the agreement. He has the responsibility to pay compensation to the insured against a valid claim.

Rights and responsibilities of insured

The Insured has a right to collect compensation from the Insurer against a valid claim. He has the responsibility to pay the premiums to the Insurer, disclose all relevant data to the Insurer in utmost good faith and should comply with the terms and conditions laid down by the Insurer.

Insurance terminology

Certain terms under insurance have specific meanings:

Loss: Insured loss is a reduction of economic value arising out of chance undesired and unplanned.

Direct Loss: These are immediate result of a insured risk, e.g., a factory has been insured against fire, the loss of factory is a direct loss.

Indirect Loss: These are the consequential losses arising out of the secondary effect of the insured's peril. For e.g. – during inundation of a house for which necessary insurance has



been taken the additional cost of the incumbents of the house living in alternate accommodation while the house is rebuilt is an indirect loss.

Chance of Loss: Is defined as the probability of loss. This probability can be worked out based on past data or on the basis of any probability estimate known as *apriori*. *Apriori* estimates are based on causality of the event.

Peril: Is defined as the cause of a loss like earthquake, inundation, price, heart attack, mutiny, etc.

Hazard: A hazard is condition that creates or increases the severity of the frequency of a loss arising from a given peril. Emission of toxic gases, radiation out of nuclear reactor, land slides, etc.

Moral Hazard: Dishonesty of the insured leading to risk exposure, e.g., suppression of vital facts relating to risks.

Morale Hazard: An indifferent attitude to losses that results out of an insured peril reflects a callous attitude tending to morale hazard.

Proximate Cost: Proximate cost of a loss is the first peril in the sequence of events resulting in a loss or it is root cause.

Nature of insurance

The uncertainty of risk has its behavioral aspects and the tendencies arising out of such behaviors.

Pooling: For a single period, many insured contribute premium to an insurance company and thus the insurance company pools all the premiums to pay for the losses as and when they occur during the ensured period. This pooling of resources is a fundamental aspect of insurance.

Bonding: Insurance contract is a legal bond between the insurer and the insured.

Insurable Loss Exposures

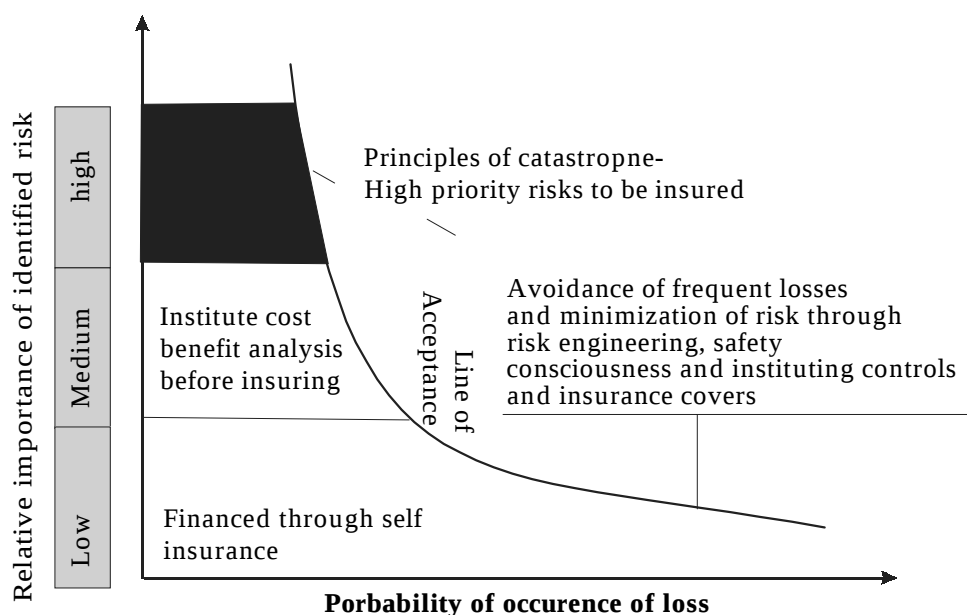
The characteristics for an exposure to be covered by Insurance are as follows:

- **Pure Risk:** These are classified into *personal risk*, *property risk*, *liability risk* and *loss of income risk*.
- *Personal Risk* – Can happen due to premature death, old age, sickness or disability and unemployment.
- *Property Risk* – Can be classified as loss of property, loss of use of property, additional expenses arising out of loss of property.
- *Liability Risk* – Can arise as injury to people or damage to property or negligence or carelessness.
- *Loss of Income Risk* – Consequential loss of income arising out of personal or property losses.
- **Similar Exposures:** Prediction of losses through application of statistical computations with the help of theory of probability require a sizeable population of similar exposures.



This is particularly important in that estimation of probabilities for the happening of an event needs an adequate large sample, as accuracy increases with bigger sample.

- **Accidental Losses:** Insurance contracts allow payments only for accidental losses which are beyond the insured's control. Losses taking place unintentionally alone are covered by Insurance. Suppression of information of a known risk will not entitle for compensation.
- **Definite Loss:** A definite loss has three facets. It should be recognizable and should be susceptible to verification. The loss should be measurable. This is particularly important in that premium are computed mainly on the estimated quantification of losses.
- **Large Loss:** As there is always a consideration in the form of a premium for receiving a compensation for a loss, care should be taken that the premium to loss ratio is sufficiently favorable.
- **Catastrophic Losses:** Catastrophic losses from natural disasters have two main characteristics :
 - They are limited to geographic area where the impact has taken place.
 - Prediction of the event is very difficult. For example storms and floods or earthquakes etc. can create catastrophic losses as such an Insurer will have to take special precautions of calculating the premiums. Even then the loss may be so huge that the consumers normally resort to sharing the risks through reinsurance as also ensures dispersion of risks over a larger geographical area. To estimate the frequency and severity of the catastrophic losses probability analysis is resorted to:





RISK ANALYSIS

Analytical tools for risk analysis

In insurance contracts risk arises from insurance policies for life, property and corporate. The analytical tools for these types of risk can be classified as follows:

Type of risk	Narration	Models
Life	Unexpected increase in life claims can create a risk of loss	Surplus testing models
Catastrophe	Due to catastrophe like earthquakes, fire, inundation, storms, etc, risk of loss to property and life can be very high	Simulation, exceedence probability models
Non- Catastrophe	Due to unexpected increase in non-catastrophe claims like car accidents, fire, etc	Frequency severity modeling, payout pattern analysis using loss triangles
Event	Risks of loss due to natural disaster, legal litigation, fraud, etc	Extreme value theory

Financial risk measures

Return on risk-adjusted capital (RORAC) – target ROE measure in which the denominator is adjusted depending on the risk associated with the instrument or project.

Risk-adjusted return on capital (RAROC) – a target ROE measure in which the numerator is reduced depending on the risk associated with the instrument or project.

Economic capital – market value of assets minus fair value of liabilities. Used in practice as a risk-adjusted capital measure; specially, the amount of capital required to meet an explicit solvency constraint (e.g., a certain probability of ruin)

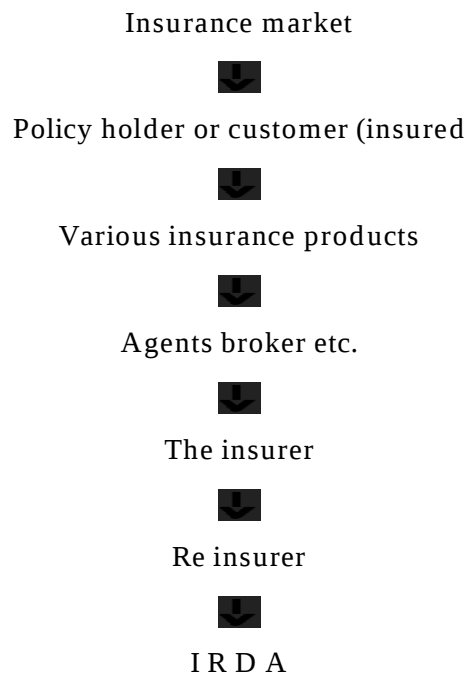
RAROC – expected net income divided by economic capital (thus, the more technically correct label is RORAC – see above – but in the insurance industry, RAROC is the term commonly used). RAROC is typically to evaluate the relative performance of business segments that have different levels of solvency risk; the different levels of solvency risk are reflected in the denominator. Evaluating financial performance under RAROC calls for comparison to a benchmark return; when the benchmark return is risk-adjusted (e.g. for volatility in net income), the result is similar to RARORAC (see above), though the term RAROC is still applied.

Embedded value – measure of the value of business currently on the books of an insurance company; it comprises adjusted net worth (the market value of assets supporting the surplus) plus the present value of expected future profits on inforce business. (Embedded value differs from appraisal value in that the latter also includes the value of future new business.) The performance measure is often expressed in terms of growth (i.e., year on year increase) in embedded value.



INSURANCE INDUSTRY AS SERVICE SECTOR

In Service Sector the Insurance Industry ranks very high and is particularly relevant to a growing economy like India. As the insurance Industry encourages and mops up Savings of the Society and also provides a safety net for personal and institutional risks this industry needs to be properly run and the structure properly regulated. In this regard, structure of the insurance industry is given below:



Insurance is classified into the following types: Non-Life (General) Insurance, and Life Insurance in most of the countries except in USA. In USA the insurance industry is classified into Property & Casualty, Life and Health. In India, General insurance includes Property & Casualty, Fire, Engineering Projects, Motor, Aviation and Marine Insurance.

General Insurance also includes legal liability to others like collision liability, employers' liability, etc. The Insured gets compensation only if the event occurs. The insured does not get any return if the event does not occur. Almost all insurance contracts are annual contracts other than the individual life insurance contracts which are long term contracts

INSURANCE PRODUCTS

According as insured being a person or institution the products offered depend on various risks covered. Personal risk insurance policies cover life insurance, accident, sickness, old age, etc. Property insurance covers risks against fire, marine, liability, casualty and surety. While the personal insurance is taken under life insurance policy, Property insurance is termed as General Insurance in India.

In India insurance has been broadly categorized under two heads, life and general insurance. Until recently Life Insurance Corporation of India (LIC) was holding a monopoly. Recently,



Government of India liberalized foreign direct investment in insurance sector and the entry of foreign insurance companies has been allowed..

Products of life insurance for the individual cover the personal risks and the products are as follows:

- Whole life schemes
- Endowment schemes
- Money back policies
- Joint life plans
- Investment plans
- Capital market plans
- Group insurance
- Social security scheme
- Pension plans

All these schemes are aimed at covering personal risks individually or collectively. The collective schemes like group insurance schemes, pension plans and social security schemes pooled risks under such are able to offer benefits for a very low premium.

General Insurance Corporation, a Government of India enterprise and other foreign companies with Indian entrepreneur participation offer commercial, industrial, liability and social products.

Commercial insurance involves the following major products:

1. Jewelers block policy
2. Bankers indemnity policy
3. Shop keepers policy
4. Marine cargo policy

Industrial insurance involves the following major products:

- Fire policy
- Burglary policy
- Machine break down policy
- Contractors all risk policy
- Electronics equipment policy
- Consequential loss of profit policy

Liability insurance involves the following major products:

- Public liability policy



Product liability policy

Professional indemnity policy

Social insurance involves the following major products:

Rural insurance policy

Student safety insurance policy

Child welfare policy

Medi-claim policies

Women marriage welfare policy

An analysis of the array of the products shows that risk management in the case of each category varies according as the main risks and the associated risks. Only in the case of life, the compensation for loss of life can vary as the value on life can never be indemnified and is price less. So, the compensation normally paid by the insurer is based on the face value of the policy. However, the risks covered are clearly signified and insurable interest also is identified. The insured has to act as a man of normal prudence and follow the conditions laid down by the insurance company. Apart from life cover other insurance policies are in the nature of investments quantified by the insured and advised by the insurer e.g., endowment schemes, money back, medi-claim, etc.

For commercial and industrial insurance policies the main risks are identified as also the allied risks. This is particularly relevant as much as an industrial fire policy may also have an adjunct as consequential loss of profits. These aspects need proper categorization of the hazards and the corresponding tariff for that e.g., non- hazardous, hazardous, explosive, etc. In the case of a claim the loss measurement or adjustment becomes a special assignment and they are carried out by qualified and approved surveyors.

There are new products as part of derivatives to cover catastrophic losses. These are catastrophe bonds and options (CAT bonds). CAT bonds belong to the group of hybrid instruments like derivatives. Investors get their returns on these CAT bonds on the incidence of a calamity that is underwritten. The return to the investor will be based on the direct loss to the insured because of the loss or on the basis of an accepted industry index. This CAT bonds can be traded in the exchanges and are sensitive to the incidents of catastrophes.

FUNCTIONS OF INSURERS

The function of insurers can be classified as follows:

Receiving applications from intending individuals or institutions for insurance cover and the offer of cover to individuals after due evaluation and procedures.

Under writing involves evaluating the application forms submitted by intending individuals or institutions on the basis of the information provided by them. The veracity of the information will be scrutinized and after confirmation key aspects, if necessary, underwriting is resorted to. The objective of the underwriting is to ensure that the insurer will not incur losses that are different from the pattern on the basis of which premium rates are calculated. Under writing is done by judgmental method or numerical method.



Insurance pricing

Principles of Insurance

Compensating the exact loss that arises due to the event insured against is referred to as **Indemnity**. Indemnity is security against financial loss. An insurance policy is designed to place the insured in the same financial position as he was before the occurrence of the event insured against. In case of loss, the insured shall be fully indemnified. The measure of indemnity depends on the basis of the contract like the replacement value or the agreed value as stated in the policy. The compensation is given to the insured only if an event occurs – otherwise the insured does not get any other returns. A peril or contingency specifically excluded from the terms of the policy is called an exception.

Insurable Interest: A legal or equitable financial interest in property or in the happening of some event. Any party who suffers a financial loss due to the occurrence of the event has insurable interest like Owners, Partnership or joint ventures, Institutions granting loans or mortgages, etc.

IRDA

This institution came into existence on the basis of Insurance Regulatory and Development Authority Act (IRDA), 1999. Providing Licenses for transacting insurance business and reviewing premium rates are the twin activities of IRDA. IRDA is consumer friendly and protects the interests of the consumer through adequate checks, premium rates, products, procedures and investments made by the insurance companies.

The Insurance Regulatory Authority of India (IRDA) regulated the general insurance covers for over a decade. Owing to the increase in the number of players in the Indian insurance market in the last few years and the fierce competition in the General Insurance segment, IRDA wanted to de tariff the market in January 2007 and Insurers were given greater freedom to price the three insurance covers that were still regulated by IRDA: fire, engineering and motor. Policies can now be priced on a standalone basis, and therefore match the risk. The second phase of de tariffing will allow the Insurers to structure their products as well where they may be allowed to offer some optional covers in addition to the compulsory covers. In other countries like U.S.A. where product structuring is allowed, factors like the colour of the car also can influence premiums.

De tariffing would allow Insurers to lower premiums. For policyholders, de tariffing is always beneficial. For the same amount of premium, customers can get a higher sum insured. The industry can also benefit from this, since lower premiums will lead to increased sales and thus product penetration.

PRICING

The process of determining or fixing the rates of premium for a particular product is known as pricing. Traditionally, premiums have been calculated based on tariffs set by the Insurance Regulatory Authority. The rates are derived based on various factors like past loss ratio, location of the asset, type of asset, as well as exposure to the risks. Rate is the pricing factor upon which the premium is based. For example, car insurance policies are priced based on factors such as make and model of the car, purpose for which the car is used, etc.



Premium is calculated using the formula

$$\text{Premium} = \text{Annual Rate} * \text{SI}$$

The annual rate is usually given per thousand SI.

Where SI is Sum insured.

Traditionally, for motor insurance, the parameters that are used to price a policy have been model of the car, age of the driver, location of the car and purpose for which the car is driven, etc.

The industry will eventually move from price rating to risk rating. The pricing for each individual will be based on their track record. For example, for 'own damage' in a car insurance policy, the pricing parameters will be the model of the car, driver's age and engine capacity.

This is of particular importance to a management accountant as it is in the nature of pricing a product. The insurance premium can be broken up into four parts:

Cost of payment for losses

Cost of operation and maintenance of insurance pool

Reserve for contingencies

Return on Investment.

In the life insurance, calculation of insurance premium is very complicated exercise as the variables involve are many, e.g., factors aggravating mortality rates, like smoking, drinking, drugs and other habits, age of the insured, occupational hazard, etc. This computation is normally through actuarial computations involving mortality rates. Premium rate is often referred as rate per unit of exposure.

DEMAND FOR RISK MANAGEMENT (UTILITY THEORY)

The destruction caused by any unforeseen event is referred to as "Risk". In the insurance business, people exposed to the same risk form a group and share the loss together. Insurance companies collect the shares (Premiums) in advance from the group and create a fund. This fund is utilized to pay for the loss (Claims) that is incurred by any member of the group. Risks can be classified into various types:

- a) Financial and non-financial risks
- b) Dynamic risks
- c) Speculative risks

Risk cannot be avoided through insurance but may be considered as a means to transfer the risk. It is also a mechanism to compensate the financial and economic loss due to risk. Safety measures and damage control management can be adopted to mitigate or eliminate the magnitude of risk. The fundamental principle of insurance is to share the losses and to substitute uncertainty with certainty.



Expected utility theory emphasizes that the demand for insurance is a demand for certainty. The conventional specification of the theory perceives that the buyers of insurance prefer certain losses to actuarially equivalent uncertain losses. But certain other surveys indicate that individuals actually prefer uncertain losses to actuarially equivalent certain losses.

This can be explained by saying that “the purpose of any insurance policy is to convert an uncertain, but potentially large loss into a certain small loss. Such a conversion benefits the consumer, if greater losses cause progressively larger declines in utility (i.e., if there is diminishing marginal utility of wealth)” – Newhouse, 1978, page.19. For example, insurance against fire peril where the bigger part of the loss will be insured that is uncertain for a specific premium today.

Another approach evaluates a conventional expected utility theory explaining the demand for insurance by an individuals demand for an uncertain *payoff* of income in a pre specified state. This can be explained through the demand for health insurance. According to this theory, becoming ill fundamentally changes preferences. Thus an insured customer is able to transfer income into the ill state where the marginal utility of income is greater.

REINSURANCE

All insurance companies have a risk appetite i.e. a limit on the amounts that they can settle for any given claim that is made by the Insured. Any claims made beyond this specified limit by the insured is settled by another company referred to as a Reinsurance company. Thus, Reinsurance is insurance for insurance companies.

Reinsurance is the transfer of part of the risk that a direct insurer assumes by way of an insurance contract on behalf of the insured, to a second insurance carrier, the Re-insurer who has no direct contractual relationship with the insured. Direct insurers need reinsurance to limit annual fluctuations in the losses they must bear on their accounts and to protect the assets of the company in the event of a catastrophe. Direct insurers take on hazards and risks from the policy holders. Re-insurers take on hazards and risks from the direct insurer.

Insurance companies typically enter into an agreement with the Re-insurer and sign a Re-insurance Treaty which states all the terms and conditions of the agreement. The Re-insurer agrees to accept a certain fixed share of risk upon terms as set in the agreement. The well-known Reinsurance companies in the world are Swiss Re, Munich Re, and Zurich Re.

For example, an Insurance company has a risk appetite of Rs.1 million. but has issued a general insurance policy for an engineering project where the sum insured is Rs.4 million. If a claim is made on this particular policy, the claim will be settled for Rs.4 million. Rs. 1 million will be paid by the Insurance Company that issued the policy and the remaining 3 million will be paid by the Re-insurer.

LIABILITY EXPOSURES AND ISSUES

Liability exposures can be defined as those losses, which are caused due to the failure to accomplish legally imposed obligations rather than enjoy the rights. The limit of liability of the Insurers under a policy is the sum insured. If there is a dispute in the settlement of a claim made by the insured, the matter can be taken to the court of law seeking a fair settlement.



The cases of liability arising while performing various duties are given below:

- While possessing a land a liability can arise from ownership or use and the extent of liabilities are dependent on the three categories of visitors namely,
- **Trespassers:** A person entering the premises without any permission is termed a trespasser and as such the land owner is not held responsible for any loss or injury sustained by the trespasser after entering the premises. But trespassing children are an exception to this rule and the land owner will be absolutely responsible for the injuries to trespassing children
- **Licensees:** As a licensee is an individual permitted to visit the premises, the land owner is liable for any loss or injury to the licensee
- **Invitees:** Invitee is again an individual who is permitted to visit the premises. So the land owner has a liability for any loss or injury to the invitee on entering the land
- **Liability arising from business:** Liability arises when certain promises made in regard to products or services offered. In order to protect the interests of the customer, statutory authorities have put in place stringent regulations to compensate the customer for the losses incurred by him due to failure of promises by the seller (Warranty)
- **Professional liability:** A professional applies his special knowledge and skill in practice like a lawyer. Therefore a client or a patient can sue a professional for negligence or wrong doings
- **Vicarious liability:** This exposure arises due to the acts of the agents who are appointed by the principal. The principal is always liable for the agent's actions.
- **Bailey liability:** Liability of a bailey is caused by any damage to the property or goods transferred to him in the course of business temporarily
- **Contractual liability** is caused when promises are made to deliver particular goods or services at a price already determined and at certain time. The liabilities can be two fold:
 - Post completion contractual liability: A liability arises when an agreement is made by a contractor for a performance of an agreed service, e.g., building contractor
 - Professional services liability: A professional applies his special knowledge and skill in practice like a lawyer. Therefore a client or a patient can sue a professional for negligence or wrong doings
- **Employer - Employee liability:** In our country this relationship has been statutorily governed through the following statutes:
 - Minimum wages act
 - Payment of wages act
 - Workmen's compensation act
 - Provident fund act



- Gratuities act
- Shops and establishments act
- Industrial disputes act
- Trade union act
- Factories act
- **Liability for ownership of motor vehicle:** These liabilities are caused through negligence in use as well as no fault liability regardless of the person's involvement in the act
- **Nuisance liability:** Public nuisance can involve criminal liability through actions, which are detrimental to the community at large. Private nuisances may attract civil action arising out of noise pollution, pets, storing explosives, etc
- **Agro and Bio liabilities:** The basic liability issues arise as follows:
 - Farmers credit liability
 - Consequential losses liability
 - Genetically modified crop seed liabilities
 - Consulting expenses and royalty liabilities
 - Casualty liabilities on farmers assets
 - Latent deficiencies liabilities (public and professional liabilities)
 - Inflation liabilities (dynamic risks in risk management) affecting the farming community

Dr. M.S. Swaminathan committee has identified insurance as a panacea for the above liabilities and the possible steps can be:

Recognizing agriculture as an “open roof” industry and bringing in concepts of industrial liability insurances

Pre-harvest hedging

Cross dimensional liability coverage for inability

Linking of life assurances of farming community with their property and casualty insurances

MANAGEMENT ACCOUNTANT'S ROLE IN INSURANCE RISK MANAGEMENT

The management accountant wears two hats, a management accountant in an insurance company and a management accountant in an insured company. Both of them have the responsibility for managing the risk from their own company's angle. A management accountant in an insurance company has to fully comprehend the computation of premium rates for different insurance products as also fully define the character of losses to be covered as a cross functional process along with the Actuarial professionals. Value imputation of the risks to be covered by the insurer's company has two aspects:



- Quantifying the total risk to be covered for calculating a premium as a definite fraction of the risk value covered by the policy
- If the quantification of risk is so high and the corresponding premium is likely to be also high enough for an insured to back out, then develop a framework where the insurer's company can re-insure itself for the policy risk with another insurance company. This will help in reducing the premium for the insured

A management accountant in an insured's company has his task cut out very clearly in two directions. At the time of covering the risk he has to work very closely with the cross functional team to identify the direct values of the risks involved and the indirect consequential values of the risks involved. For example, firstly, the replacement cost of a plant being insured is a direct cost and has to be quantified by proper methodology and secondly, the consequent loss of profits due to the stoppage of plant due to breakdown of the plant being replaced. In a service company it may be a cessation of a service being offered due to a peril such as fire or earthquake, etc and the consequential loss of profits there of.

Management accountants where ever they are need to be conversant with the use of mathematical models quantifying risk, financial cannons like Time value of money, dynamic programming, cost slopes and crashing, etc.