CHAPTER-II

REVIEW OF LITERATURE & EVOLUTION OF CROP INSURANCE

2.1 Risk Management

Risks faced by farmers are numerous and varied, and are specific to the country, climate, and local agricultural production systems. These risks and their impacts on farmers are widely researched and classified in the literature.

Key Risks Faced by Farmers are:

(a) Weather risks - Rainfall or temperature variability or extreme events.

(b) Biological risks - Pests, disease, contamination.

(c) Price risks- Low prices, market supply and demand volatility.

(d) Labor and health risks- Illness, death, injury.

(e) Policy and political risks- Regulatory changes, political upheaval, disruption of markets, unrest.

Risk management strategies involve risk mitigation, risk transfer, and risk coping. Formal (market-based) approaches (including agricultural finance and insurance) allow disciplined financial management of risks but are often challenging to implement in developing countries and may not be suitable for managing extreme risks or disasters. Informal approaches are much more frequently found at the farmer level in developing countries. They include savings, household buffer stocks, community savings, and non formalized mutuals. Insurance is a small part of an array of approaches and instruments that are available to help

the financial management of risks through transfer to a third party.[4] A large number of analysts have studied risks faced by farmers. Among the many articles a few on crop insurance are by Binswanger (1980), Jodha (1981). Ahsan (1982), Walker and Jodha (1986), Rao *et al., (1988*), Hazell *et al., (*1986); Pomareda (1986), Mishra (1996), Bhende (2002,2005), Horowitz and Lichtenberg (1993), Atwood et al., (1996). Smith and Goodwin (1996), Babcock and Hennessy (1996).

2.2 Prevailing Literature

Farmers rely on traditional methods to deal with production risk in agriculture in the absence of formal risk sharing mechanisms. They adopt different cropping strategies and farming practices in the absence of crop insurance for stabilizing crop revenue. Availability and effectiveness of these risk management strategies or insurance surrogates depends on public policies and demand for crop insurance (Walker and Jodha 1986).

The risk bearing capacity of an average farmer is very limited. In comparison, a large farm household or a wealthy farmer is able to spread risk over time and space in several ways by using stored grains or savings during bad years. He can diversify his crop production across different plots. At a higher level of income and staying power, the farmer would opt for higher average yields or profits over a period of time even if it is achieved at the cost of high annual variability on output (Rao *et al.,* 1988).

[4] Source: World Bank (2011) Agriculture and Rural development Discussion Paper 50.

Binswanger (1980), after observing the risk in agricultural investments, risk averting and risk shifting tendencies of the farmers, concludes that farmers' own mechanisms for loss management or risk diffusion are very expensive in arid and semi-arid regions.

The major role played by insurance programmes is the indemnification of risk-averse individuals who might be adversely affected by natural probabilistic phenomenon. The philosophy of insurance market is based on large numbers where the incidence of risk is distributed over individual. Insurance, by offering the possibility of shifting risks, enables individuals to engage in risky activities which they would not undertake otherwise (Ahsan *et al.,* 1982).

Jodha finds that the riskiness of farming impinges upon the investment in agriculture leading to suboptimal allocation of resources. He also finds that official credit institutions are ill equipped to reduce the exposure of Indian farmers to risks because they cannot or do not provide consumption loans to drought-affected farmers (Jodha 1981).

Crop credit insurance also reduces the risk of becoming defaulter of institutional credit. The reimbursement of indemnities in the case of crop failure enables the farmer to repay his debts and thus, his credit line with the formal financial institutions is maintained intact (Hazell *et al.,* 1986 ; Pomareda 1986; Mishra 1996;).

The farmers do not have to seek loans from private moneylenders. The farmer does not have to go for distress sale of his produce to repay private debts. Credit insurance ensures repayment of credit, which helps in maintaining the viability of formal credit institutions. The government is relieved from large expenditures

incurred for writing-off agricultural loans, providing relief and distress loans etc., in the case of crop failure. A properly designed and implemented crop insurance programme will protect the numerous vulnerable small and marginal farmers from hardship, bring in stability in the farm incomes and increase the farm production (Bhende 2002).

The farmer is likely to allocate resources in a profit maximizing way if he is sure that he will be compensated when his income is catastrophically low for reasons beyond his control. A farmer may grow more profitable crops even though they are risky. Similarly, a farmer may adopt improved but uncertain technology when he is assured of compensation in case of failure (Hazell 1992). This will increase value added from agriculture, and income of the farm family. Access and availability of insurance, changes the attitude of the farmer and induces him to take decisions which, otherwise, would not have taken due to aversion to risk. For example, rain-fed paddy was cultivated in one of the riskiest districts i.e , Anuradhapur district, of Sri Lanka, for the first time in 1962, as insurance facility was available to the farmers (Ray 1971).

Bhende (2005) found that income of the farm households from semi-arid tropics engaged predominantly in rain-fed farming was positively associated with the level of risk. Hence, the availability of formal instrument for diffusion of risk like crop insurance will facilitate farmers to adopt risky but remunerative technology and farm activities, resulting in increased income.

Some of the studies confirm the conventional view that moral hazard incentive leads insured farmers to use fewer chemical inputs (Smith and Goodwin 1996).

Babcock and Hennessy (1996), find that at reasonable levels of risk aversion, nitrogen fertilizer and insurance are substitutes, suggesting that those who purchase insurance are likely to decrease nitrogen fertilizer applications.

A study by Horowitz and Lichtenberg (1993) finds that in the US Midwest, crop insurance exerts considerable influence on maize farmers' chemical use decisions. Those purchasing insurance apply significantly more nitrogen per acre (19 %), spend more on pesticides (21%), and treat more acreage with both herbicides and insecticides (7% and 63%) than those not purchasing insurance. These results suggest that both fertilizer and pesticides may be risk-increasing inputs.

An analysis of data from US agriculture indicates that the producer's first response to risk is to restrict the use of debt. Price support programmes and crop insurance are substitutes in reducing producer risk. The availability of crop insurance in a setting with price supports allows producers to service higher levels of debt with no increase in risk (Atwood et al., 1996).

Mishra (1994) analyzed the impact of a credit-linked Comprehensive Crop Insurance Scheme (CCIS) on crop loans, especially to small farmers in Gujarat. It is observed that insured households invest more on agricultural inputs leading to higher output and income per unit of land. Interestingly, percentage increase in output and income is more for small farms.

Many of the risks insured under public insurance programme are essentially un-insurable risks. Moreover, they occur frequently and hence are expensive to insure. The financial performance of most of the public crop insurance has been

ruinous in both developed and developing countries. The multi-peril crop insurance thus is very expensive and has to be heavily subsidized (Hazell 1992). Individuals cannot influence the nature and occurrence of the risky event. Unlike most other insurance situations, the incidence of crop risk is not independently or randomly distributed among the insured. Good or bad weather may affect the entire population in the area.

Lack of data on yield levels as well as risk position of the individual farmer puts the insurance company in a difficult situation. As in the case of general insurance, agricultural insurance market also faces the problem of adverse selection and moral hazard. The higher premium rates discourage majority participation and only high risk clients participate leading to adverse selection. Moreover, in crop insurance the individuals do not have control over the event, but depending on terms of contract, the individuals can affect the amount of indemnity. Tendency of moral hazard tempts an insured individual to take less care in preventing the loss than an uninsured counterpart when expected indemnity payments exceed the value of efforts. The imperfect information (gathering information is costly) discourages participation of private agencies in crop insurance market. Similarly, incidence of random events may not be independent. Natural disasters may severely damage crops over a very large area and the domain of insurance on which it is based crumbles i.e., working of the law of large number on which premium and indemnity calculations are based breaks down. The private insurance companies of regional nature will go bankrupt while paying indemnity claims unless they spread risk over space.

Crop insurance is based on the principle of large numbers. The risk is distributed across space and time. The losses suffered by farmers in a particular locality are borne by farmers in other areas or the reserves accumulated through premiums in good years can be used to pay the indemnities. Thus, a good crop insurance programme combines both self as well as mutual help principle. Crop insurance brings in security and stability in farm income. Crop insurance protects farmers' investment in crop production and thus improves their risk bearing capacity. Crop insurance facilitates adoption of improved technologies, encourages higher investment resulting in higher agricultural production.

2.3 Evolution of Crop Insurance Scheme- India

The idea of Crop Insurance was probably first thought of by Benjamin Franklin after the severe storm on 24th October 1788 in the French countryside which destroyed the crops. But it was only in 1820s that the first crop insurance scheme in the form of hail insurance was started in France and also in Germany for cultivation of Grapes. In USA it was started in 1883 for tobacco crops. Federal Crop Insurance Scheme (FCIC) was started in 1939 in USA as multi peril crop insurance (MPCI).

In India the idea was first pioneered as early as 1912 by J.S. Chakravarthi, the Secretary and President of the Mysore State Insurance Committee. He had published the work on Rainfall Insurance based on a study of Chitradurga district from 1870-1914 in Mysore Economic Journal during 1915-1917 and explained how a rainfall index could be used to guarantee the payout to farmers due to adverse deviations. He presented a paper on 'Agriculture Insurance' in 1917 at a Conference of the Indian Science Congress at Bangalore. He published a book

entitled 'Agricultural Insurance: A Practical Scheme Suited to Indian Conditions' in 1920.

Soon after Independence in 1947 the need for introducing the agriculture insurance scheme was felt. This required examination, especially, following an assurance given by then Minister of Food and Agriculture in the central Legislature to introduce cattle and crop insurance. In 1948 Government appointed Shri G.S. Priolkar as Officer on Special Duty, to study the feasibility of the same and if the insurance should follow 'Individual Approach' or a 'Homogeneous Area'. The study favoured 'Homogeneous Area Approach'. Irrespective of their individual fortunes, individual farmers should pay the same rate of premium and receive the same benefits by treating the various agro-climatically homogeneous areas as single unit. His recommendations were considered at a Conference held in Bombay in 1949 and Indian Council of Agricultural Research (ICAR) was entrusted to prepare a draft Pilot scheme. The scheme as proposed was envisaged for a five year period in the States of Madras (5 centres), Bombay (3 centres), Madhya Pradesh (5 centres) and UP (5 centres) for certain selected crops.

During the Third Five Year Plan Government of Punjab desired to implement an all risk compulsory crop insurance scheme. This scheme too was based on Area Approach. In 1962, advice of Food and Agriculture Department (FAD) expert on crop insurance, Dr. T Yamanchi, was sought. Although due to paucity of funds the scheme could not be taken up but it led to the formulation of a model scheme for crop insurance in 1965 which was referred to an expert Committee headed by

Dharam Narain. However, the committee recommended against setting up an insurance scheme.

First Ever Individual experience Scheme: A beginning was made in 1972 by implementing an experimental crop insurance scheme in Gujarat for H-4 cotton in a few districts by General insurance Department of Life insurance Corporation. After nationalization GIC continued with the scheme and implemented a few more experimental schemes in 1974 and 1975 for selected crops in a few States. This scheme was based on 'individual approach' and uniform guaranteed yield was the basis of settlement. It continued upto 1978-79 and covered only 3110 farmers for a premium of Rs. 4.54 lakhs against a claim of Rs. 37.88 lakhs. Due to the uneconomic nature of the scheme it was phased out.[5]

Pilot Crop Experience Scheme (PCIS): Based on the recommendation of Prof. V.M. Dandekar, a Pilot Insurance Scheme (PCIS) was introduced by GIC in 1979. This scheme was based on an 'Homogeneous Area Approach' and was confined to Loanee farmers only in 13 States. It covered cereals, millets, pulses, oilseeds, cotton & potato crops and covered 6.27 lakh farmers for a premium of Rs. 196.95 lakhs against claims of Rs. 157.05 lakhs.[6]

Comprehensive Crop Insurance Scheme (CCIS): This scheme was introduced with the participation of the State Government from April, 1985. It was based on Homogeneous Area approach and was linked to short term crop credit. It was a multi agency scheme with participation of Central Government, State

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[5] Agriculture Finance Corporation Ltd. Head Office, Mumbai, Jan. 2011, "Report on Impact Evaluation of Pilot Weather Based Crop Insurance Study (WBCIS), submitted to Ministry of Agriculture, DAC, GOI.

[6] Jain, R.C.A., Jan-June 2004, Secretary Ministry of Agriculture & Co-operation, Government of India, "Challenges In Implementing Agriculture Insurance And Re-Insurance in Developing Countries", *Paper presented at ICDC.*

Government, Banking Institutions and GIC. It was an optional scheme for States for a few crops and covered Loanee farmers only. The Central and State Government shared premium and claims in the ratio of 2:1. This scheme was implemented in 15 States and 2 UTS until Kharif 1999. It covered 762.65 lakh farmers, total Insurance charges were 403.56 crore and claim was to the tune of 2303.45 crore.

Experimental Crop insurance Scheme (ECIS): During 1997 this scheme was introduced from Rabi 1997-1998 similar to CCIS but was meant for small and marginal farmers with 100% subsidy in premium. This was implemented in 14 districts of 5 States. The Central and State Government shared the premium, subsidy and claims in ratio of 4:1. This scheme was discontinued due to financial and administrative difficulties.

Pilot Scheme on Seed Crop Insurance (PSCCI): Launched in 1999-2000 from Rabi crop.

Pilot Farm Income Insurance Scheme (FIIS): This was a revenue based insurance scheme introduced on a Pilot basis during the Rabi 2003-2004 season for addressing the income risk using the interaction between yield risk and price risk so as to stabilize farmers crop income. Natural perils covered were Flood, Storm, Cyclone, Hailstorm, Land Slide, Drought, Dry Spells, largescale outbreaks of Pests/Diseases and adverse fluctuations of market prices against Minimum Support Prices. The crops covered were rice and wheat. The scheme was based on Homogeneous area approach and was compulsory for borrowing farmers and voluntary for non-borrowing. The Government subsidy was 75% for small/marginal farmers and 50% for other farmers.

Sookha Suraksha Kavach (Drought Risk Insurance): This is specially designed for Rajasthan to cover 23 districts for crops like guar, bajra, maize, jowar, soyabean and groundnut due to high spatial and temporal variation in rainfall across West Rajasthan. Rainfall indices are prepared on the basis of data from specified rain gauge stations. Claims are automated and directly paid to the bank account.

National Agricultural Insurance Scheme (NAIS): In 1999--2000 with Rabi crop a broad based Insurance scheme was introduced to meet the demands of States and farming communities to improve the scope and content of CCIS. The Scheme provides insurance to even Non-Loanee farmers and includes also commercial/horticulture crops. The sharing of financial liabilities between Centre and State now is 1:1 instead of 2:1. More risk coverage can be chosen by farmers by paying more premium. This is administered by Agricultural Insurance Company of India Limited and provides coverage to approximately 35 different crops during the Kharif and 30 during Rabi season.

Modified Agricultural Insurance Scheme (MNAIS): MNAIS Pilot has been approved for three seasons starting from Rabi of 2010-11 in 50 districts and it is quite likely the scheme may replace the existing NAIS. This new version largely takes care of the lacunae faced by NAIS. Premium subsidy ranges between 25% to 75% shared equally by Centre and States. The Insurance unit has been lowered to village/village Panchayat level but this also simultaneously increases the workload at State level and States are requesting Government to share the cost burden of implementation.

2.4 Weather Based Crop Insurance

2.4.1 Weather Based Crop Insurance - Global

It was during the 21st century that weather based crop insurance caught the imagination of policy makers and Development institutions like World Bank. It is a relatively new product, becoming implemented in developing countries only within the last decade. The World Bank took an early lead in developing rainfall insurance programmes, starting with a rainfall index insurance product in Morocco (Skees et al. 2001). However, this programme was never implemented, as declining rainfall trends in the region made obtaining re-insurance impossible.

Another country that has had a successful scale-up of index insurance is Mexico, which provides weather-based insurance through a Ministry of Agriculture programme to assist drought-affected farmers (Fuchs and Wolff 2011). This product differs from the weather insurance sold in India, as the insurance contracts are sold to state Governments rather than individuals. This programme has been quite successful, with a US$90 million sum insured in 2007. [7]

Due to advocacy of the World Bank there are many other pilot programmes of weather based crop insurance around the world. Countries like Mexico, Ukraine, Malawi, Ethopia, China and India are running the pilot programme for quite sometime while others like Tanzania, Nicaragua, Thailand, Kazakhastan, Senegal, Morocco, Bangladesh, Vietnam etc. are developing and fine tuning it.

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[7] Cole S, Bastian G, Vyas S, Wendel C, Stein D (2012) The effectiveness of index based micro-insurance in helping smallholders manage weather-related risks.
London: EPPI-Centre, Social Science Research Unit, Institute of Education, University of London. (www.dfid.gov.uk).

In India, during the year 2003, the first pilot project Rainfall Insurance, was developed by ICICI-Lombard General Insurance Company in the private sector. This was followed by IFFCO Tokio General Insurance Company and by public sector Agricultural Insurance Company of India (AIC) in 2004.

Despite the vast number of pilot programmes and some pockets of success, most programmes have achieved little success at moving beyond the pilot stage, especially when insurance is sold on its own (as opposed to being bundled with credit). Therefore, understanding the determinants of take-up is an important question that we will explore in this review.[8]

As formal weather insurance products have only recently begun to spread through developing countries, and taking into account the lag time in publishing, the body of published, peer-reviewed literature on the impacts and issues associated with these products is quite limited. To our knowledge, no systematic review of high quality evidence focusing on index-based micro-insurance has been attempted so far.

2.4.2 Weather Based Crop Insurance – India

The design and pilot testing of first Index based Weather Insurance product in 2003-04 was done in collaboration with ICICI Lombard, World Bank and the Social Initiatives Group (SIG) of ICICI Bank for 200 groundnut and castor farmers in the rain-fed district of the Bank and also 50 soya farmers in Mahaboobnagar, Andhra Pradesh. The policy was linked to crop loans given to the farmers by

[8] Cole S, Bastian G, Vyas S, Wendel C, Stein D (2012) The effectiveness of index based micro-insurance in helping smallholders manage weather-related risks. London: EPPI-Centre, Social Science Research Unit, Institute of Education, University of London. (www.dfid.gov.uk).

BASIX Group, an NGO, and sold through its Krishna Bhima Samruddhi Area, Madhya Pradesh through Pradan, an NGO, 600 acres of paddy crop in Aligarh through ICICI Bank's agribusiness group along with the crop loans, and on oranges in Jhalawar district of Rajasthan.

In 2004-05 IFFCO-Tokio General Insurance (ITGI) piloted rainfall insurance under the name -"Baarish Bima" in Andhra Pradesh, Karnataka and Gujarat.

Agricultural Insurance Company of India (AIC) introduced pilot rainfall insurance (Varsha Bima) during 2004 South-West Monsoon period in 20 rain gauge areas across states of Andhra Pradesh, Karnataka, Rajasthan and Uttar Pradesh which covered five different options tailored to varied requirements of farming community. Learning from the experience of the pilot project the scheme was fine-tuned and implemented as "Varsha Bima -2005" in about 130 districts across Andhra Pradesh, Chattisgarh, Gujarat, Karnataka, Mahrashtra, Madhya Pradesh, Orissa, Tamil Nadu, Uttarakhand and Uttar Pradesh during Kharif 2005. On an average, 2 or 3 blocks/mandals/tehsils were covered under each India Meteorological Department (IMD) rain gauge station.

In 2006 during kharif season the scheme of Varsha Bima-2006 was implemented across 150 districts/ rain gauge station areas in16 states.

Based on the experience of the existing weather risk insurance products in 2007, the Government asked AIC to design the Weather Based Crop Insurance Scheme as a pilot project. WBCIS of AIC was implemented in the selected areas of Karnataka on a pilot basis during kharif 2007 season covering eight rain-fed crops, insuring crops grown in nearly 50,000 hectare insured for a sum of Rs.50 crore. Composite weather risk indexed-based insurance included perils like rise

in temperature, un-seasonal rainfall, humidity, frost risks, etc. Technical assistance for a robust product was obtained from Indian Agricultural Research Institute to enable product structuring using Crop Growth Simulation.

Modeling platform. Some of the constructs used are given in Table 2.1.

Table 2.1: Constructs Used in Weather Indexed based Insurance[9]

Sr. No.	Weather Parameter	Components
1.	Rainfall	Deficit rainfall, Consecutive Dry Days, Number of Rainy Days, Excess rainfall
2.	Temperature	Max. Temperature (heat), Min. temperature (frost), Mean Temperature, Hourly chilling units
3.	Relative Humidity	High Humidity
4.	Wind Speed	High Wind Speed
5.	Disease proxy	Combination of weather parameters like rainfall, temperature & humidity

Participation of private sector was allowed in this scheme from Rabi 2007 season. This scheme was initially for non-loanee farmers only then was extended to both loanee and non-loanee farmers. Crops included both low and high value crops and also both seasonal and perennial.

2.5 Global Experiences with Crop Insurance

To enable farmers to cope with agricultural risks globally, billions of dollars are spent annually on supporting crop insurance programmes by way of public subsidies.

Public crop insurance programmes have been around for several decades in US, Japan, Brazil, Sri Lanka, Mauritius, Mexico and other countries. In their attempt to design and implement agricultural insurance, many governments in developing countries have sought technical assistance from the international community,

[9] Working Group report of Planning Commission for the 12th five year plan (2012-2017),Ch. IV.

including the World Bank. The Bank is one of the few international financial organizations that has a fully dedicated insurance team of agricultural insurance experts, who currently provide technical assistance in more than 20 countries.

The crop insurance support mechanism of some of the major countries is given in Table 2.2 below:[10]

Table 2.2: Government Crop Insurance Support Mechanism In Major Countries

S.No	Country	Nature of Support
1.	USA (covered nearly 2 million out of total 8 million farmers and about 78% of cropped area during 2003)	- Subsidy in premium (ranges from 38 percent to 67 percent; average for 2003 is 60 percent) - Reimbursement of administrative expenses of insurance companies (these were about 22 percent of total cost of the program during 2003-4) - Reinsurance support for risky crop lines - Technical services in premium, policy guidelines - free insurance of catastrophic cover for resource poor farmers - non insured assistance to farmers for crops no insurance is available **Over all subsidy is about 70-75 percent**
2.	Canada	- subsidy in premiums (80-100 percent for lower levels of coverage and 50-60 percent for higher levels of coverage) - significant contribution towards provincial administrative costs - provides deficit financing to provincial governments - technical services by setting premium rates **Over all subsidy is about 70 percent**
3.	Philippines	- subsidy in premium (ranges from 50 percent -60 percent) - Banks share premium of loanee farmers (15-20 percent of total premium cost) - Financial support to Philippines Crop Insurance Corporation (PCIC) in extreme adversities **Over all subsidy is about 70 percent for loanee farmers & about 50 percent for non-loanee farmers**

[10] Report Agricultural Finance Corporation Limited, Jan 2011 submitted to DoAC, Ministry of Agriculture and Report of working group on Risk Management in Agriculture XI Five Year Plan 2007-2012.

4.	Spain	- Subsidy in premium (average 58 percent during 2003) - Reinsurance support (50 percent of reinsurance cost is paid by the government) - Technical guidance **Over all subsidy between 50-60 percent**

Hazell (1992) quantifies the condition for sustainable insurance as follows:

$$(A + I) / P < 1$$

Where, A = average administrative costs; I = average indemnities paid; and P = average premiums paid.

As per Table 2.3, the ratio of indemnities paid to premiums collected (I/P) is less than one (0.99) only in case of Japan while the USA (1.87) stands next to Japan in controlling the loss followed by Costa Rica (2.26). The I/P ratio is comparatively high (5.11) in case of India. However, the ratio of administrative costs to premiums collected is very high (3.57) in Japan when compared to the USA (0.55) and Costa Rica (0.54). The high administrative costs of Japanese crop insurance scheme were attributed to its robust organizational structure starting from "farmers associations" at grassroot level up to "National Agricultural Insurance Association at the apex level. The operational dynamism of these associations largely contributed to the success of Japanese crop insurance programme, particularly, the indemnities paid. When it comes to the overall loss ratio, (A+I)/P none of the above nations derived any advantage indicating that for a crop insurance programme, whether for an advanced or a developing country. One must invest a great deal in administrative cost and monitoring before having a crop insurance programme that will be actuarially sound.

Table 2.3: Financial Performance of Crop Insurance Programmes in Some Select Countries

Country	Period	I/P	A/P	(A+I)/P
Brazil	1975-81	4.29	0.28	4.57
Costa Rica	1970-89	2.26	0.54	2.80
Japan	1947-77	1.48	1.17	2.60
	1985-89	0.99	3.57	4.56
Mexico	1980-89	3.18	0.47	3.65
Philippines	1981-89	3.94	1.80	5.74
USA	1980-89	1.87	0.55	3.42

Source: Skees (2003)

The ratio I / P shows that apart from Japan, most farmers appeared to make a killing from crop insurance, receiving two to four times, as much money as they pay in. Despite that, the policy was not popular and had to be made compulsory. Adverse selection may be a likely reason for this. As farmers are often grouped into risk categories when the premium rates are calculated, but receive benefits that are tailored to their individual losses, the farmers in each group facing lower than average risks may end up paying too much for the average benefits they receive. However, at times, farmers are reluctant to buy insurance even when it is profitable as they expect to receive alternative payments from the Government in catastrophic years without paying any premium up front (e.g. emergency drought relief programmes).

What has been the reason for failure of Public Crop insurance? An insurable risk has the following four characteristics:[11]

1. The likelihood of the event must be readily quantifiable.

2. The damage it causes must be easy to attribute and value.

[11] New approaches to crop yield insurance in developing countries Jerry Skees, Peter Hazell, and Mario Miranda, International Food Policy Research Institute, Washington, D.C. U.S.A, November 1999.

3. The probability of occurrence should not be too high to make the insurance unaffordable.

4. Neither the occurrence of the event nor the damage it causes should be affected by the insured's behavior (i.e. no moral hazard).

While the traditional insurance literature lists a fifth characteristic (i.e. independent risk), many catastrophic risks that are co-variate are now insured by private markets (e.g. hurricanes, typhoons, earthquakes, floods). Private insurance companies do not insure yield losses due to pest and diseases, and prefer to write insurance against specific and insurable perils and not multiple risk or all risk insurance. Another important reason for failure in agricultural insurance is that public insurers have to extend their insurance to small farms, and this can add enormously to administration costs. Also when insurers know that the government will automatically cover most losses, they may find it profitable to collude with farmers in filing exaggerated or falsified claims.

Hazell (1992) reports that in Mexico, it was not uncommon for inspectors to receive bribes of about 30 percent of the value of the indemnity payments made to farmers.

Another common reason for failure has been that governments undermine public insurers for political reasons. Hazell gives examples where insurers have had to pay out against exaggerated losses in election years, as they know that farm lobbies can usually apply the necessary political pressure to obtain direct assistance for them in times of need at no financial cost.

Many crop insurance programs also tend to be too specialized, focusing on specific crops, regions and types of farmers, particularly when the insurance is

tied to the loans of an ADB that has a mandate to serve particular target groups identified by the government.

Skees, Hazell, and Miranda (1999) suggest the following guidelines for improving Government sponsored insurance products:

a) Make the insurer responsible for its own financial affairs, and deny it automatic access to Government funds when they incur losses. Subsidies are not necessarily ruled out, particularly for important target groups, but they should be fixed in advance on a pro-rated basis.

b) Only insure "insurable" risks to the maximum extent possible, e.g., specific perils like hail damage. Where moral hazard cannot be avoided, then use deductibles and other coinsurance arrangements.

c) Premiums should be based on sound, actuarial calculations, and adjusted over time to reflect actual loss payments.

d) The insurer should develop a rational insurance portfolio for managing risk, and should not be tied rigidly to the lending portfolio of an agricultural development bank. They should be required to purchase realistic levels of re-insurance in the national or international insurance markets.

e) The insurance should be voluntary and in competition with the private sector.

f) To avoid adverse selection, premium rates should be tailored to the indemnity payments that individual farmers receive, to the largest extent possible.

g) Administrative costs must be controlled.

h) In Netherlands, mutual insurance concept has attained popularity as it has regulatory approval and support activities like risk analysis, risk modeling, risk management and providing advice, and assistance for establishing mutual insurance.