

*Report of*

**THE WORKING GROUP ON**

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**RISK MANAGEMENT IN  
AGRICULTURE**

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**FOR  
THE ELEVENTH FIVE YEAR PLAN  
(2007-2012)**



सत्यमेव जयते

**Government of India  
Planning Commission**

**New Delhi**

# Report

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## **Executive Summary**

In India, agricultural risks are exacerbated by a variety of factors, ranging from climate variability and change, frequent natural disasters, uncertainties in yields and prices, weak rural infrastructure, imperfect markets and lack of financial services including limited span and design of risk mitigation instruments such as credit and insurance. These factors not only endanger the farmer's livelihood and incomes but also undermine the viability of the agriculture sector and its potential to become a part of the solution to the problem of endemic poverty of the farmers and the agricultural labor. . The criticality of agriculture in the rural transformation and the national economy seen along with its structural characteristics require substantial governmental and financial sector interventions not only to ensure household food and nutritional security of the farming community but also to generate savings and investments in this grossly under funded sector. The poor penetration and development of various risk management tools in the country also represent the huge opportunities for the emerging agricultural insurance and commodity markets to pull the producer from out of the poverty trap by insulating him from income shocks and by ensuring that a fair share of the price goes to the producer. Making a strong case for moving risk management solutions towards a sustainable actuarial regime as also harnessing the technological advances in climate science, remote sensing technologies and ICT in developing early warning systems, increasing the effectiveness of instruments for pooling, sharing and transfer of risks, enhancing the coping capabilities of the farmers and other mitigation measures has therefore guided the careful formulation of this Report

### **Recommendations:**

While detailed analysis, observations and recommendations on various aspects of managing risks in agriculture are enunciated in the respective chapters a summary of important suggestions and recommendations are detailed in the succeeding paragraphs:

## **Risk in Agriculture**

The agricultural sector is exposed to a variety of risks which occur with high frequency. These include climate and weather risks, natural catastrophes pest and diseases, which cause highly variable production outcomes. Production risks are exacerbated by price risks, credit risks, technological risks and institutional risks. Risk management in agriculture ranges from informal mechanism like avoidance of highly risky crops, diversification across crops and across income sources to formal mechanisms like agriculture insurance, minimum support price system and future's markets..

### **Climate variability and change**

The frequency and severity of risks in agriculture particularly in last few decades has increased on account of climate variability and change. The principal evidence of climatic change has been rising temperatures, erratic rainfall pattern, increase in the severity of droughts, floods and cyclones which have caused huge losses in agricultural production and the livestock population. India has developed response mechanisms for primary (crop failures) and to some extent secondary (livestock deaths) consequences of climate variability. However, a tertiary mechanism which goes beyond resource transfer to resource generation, through climate forecasting, climate information generation and dissemination, early warning system, mapping of agricultural losses through remote sensing technology and a pre and post climate change response system need to be put in place on a decentralized basis involving at risk communities. Such a response mechanism must include putting to work a catastrophe protection insurance mechanism as also the protection of country's bankruptcy legislation for the farmers.

### **Agricultural Insurance**

The prime crop insurance scheme in the country, is currently, the credit linked NAIS. While it has proven its worth as crucial risk intervention mechanism, it suffers from several limitations such as guaranteed yields which do not reflect farmer aspirations, low indemnity levels, delays in claim settlement, no coverage for horticultural crops, poor

servicing and awareness levels (especially amongst non loanee farmers) and inadequate loss coverage. On the other hand, large insurance unit sizes, high premium to claims ratios, high costs of distribution and adverse selection (particularly amongst non loanee farmers, who constitute the majority of the farming community), are amongst the difficulty factors articulated by the insurers. The government also subsidizes both the premium and claims end of the scheme making the burden both large and difficult to budget.

Ü A complex set of modifications are recommended to meet these challenges with possible additional financial implications for the government over and above the existing expenditure as detailed below:

- Reduction of the Insurance Unit to the Gram Panchayat level to minimize the basis risk. The revised financial liability to government as a consequence, on account of major crops is estimated at 30%. Annual administrative expenditure estimated for conduct of additional crop cutting experiments is Rs. 165 crores.
- A longer time yield series be used in fixing Guaranteed Yield for stable coverage, involving an increase of 15% in government exposure, to this account
- Increase in the indemnity level, involving a small increase of government expenditure of 8%
- Coverage to prevented sowing/planting in adverse condition, be selectively extended, involving added government expenditure of 5%
- Post harvest loss coverage be provided on an 'individual' basis, incurring a nominal addition in government expenditure of 2%
- Partial on account settlement of claims be implemented, without waiting for yield data in case of major disasters,
- Individual assessment of losses in the case of localized risks, like hailstorm, landslide etc be extended to all areas, involving a very nominal increase of 0.5% in government expenditure
- Uniform seasonality discipline (cut-off dates for buying insurance) be employed for participation for all farmers, both loanee and non loanee.

- Penetration amongst non loanee farmers be increased, through enhancement in service delivery and awareness building initiatives
  - A gradual shift from an administered price regime to an actuarial one, supported by up-front subsidy in premium
  - The adoption of transparent norms for premium subsidy, in an actuarial price regime to support risk transfer to international reinsurance and capital markets.
  - Premium sharing by banks be implemented, with lending banks bearing 25% of the premium payable by the farmer subject to a maximum of one percentage point of the premium
- Ü Channelising at least a part of agricultural relief funds through crop insurance to increase penetration and to finance additional expenditure on the proposed improvements
  - Ü To target 40% crop insurance penetration by 2012
  - Ü Coverage of perennial horticultural crops and vegetable crops to be taken up on pilot basis on an individual / weather insurance approach, incurring an added estimated cost of Rs. 100 crores
  - Ü Re-introduce seed crop insurance either as exclusive insurance cover or additional component of NAIS
  - Ü Launch government supported weather insurance pilot for selective crops and territories with annual financial expenditure of Rs. 50 crores.
  - Ü Strengthening and automation of weather station network of the country by installing in the 1<sup>st</sup> phase automatic weather stations in all the Blocks of the country, which be further extended to gram panchayat level in the 2<sup>nd</sup> phase
  - Ü Re-introduce government supported Farm Income Insurance with modifications covering a few pulses and oilseeds crops spread in a pilot over 40- 50 districts in the country with estimated annual expenditure of Rs. 100 crores.
  - Ü Livestock related economic activities contribute 20% to the agricultural GDP. Some segments of the livestock economy are significantly larger than that of traditional agricultures, e.g., value of milk output is Rs 1,10,000 crores as compared to paddy which is Rs 78,200 crores or wheat, Rs 48, 450 crores. However, penetration of livestock insurance is very low and stands barely at 6.58% of the insurable livestock

- population. Clearly the premium needs to be subsidized to the extent of 50% so that penetration can be raised to 30% or more during the XI five year plan.
- ü There are assets such as agricultural implements, bullock carts, pump sets, health etc. which seriously impact farmers' ability to earn an adequate income. What is needed is a single insurance policy covering all assets of the farmer under one contract. The Kissan Package Insurance Policy being sold by Public Sector Insurance companies at present cover 15 items of insurance. However, the Working Group, after considerable discussion concluded that the nature of crop-related risks are very different from those of other assets (e.g., Crop insurance covers much shorter period of time and are of a co-variate nature) so that it may not be efficient for an agency like AIC to provide such a comprehensive cover. However the AIC can always tie up with the other insurance companies and offer a one-stop shop for such insurance.
  
  - ü A large number of private insurance companies have been operating in the Indian Insurance Market since October, 2000. 2 private companies have done pioneering work in agricultural insurance chiefly by way of introduction of weather insurance products. The issue of private sector involvement in agricultural insurance may be addressed by means of the system of coinsurance in the order the AIC may be a lead insurer with underwriting capabilities and contacts with multiple agencies and private insurance companies taking shares according to their capability
  
  - ü The financial implications of the government for the XI Plan Period for the agriculture insurance (crop, livestock, pilots on farm income insurance, seed insurance & weather insurance) is estimated at Rs. 28,000 crores.

### **Agriculture Insurance Support Services**

- ü Any effective system of insurance is based on accurate and timely data. Also effective insurance mechanism operates on the law of large number and that in turn requires effective distribution channels.

Ü The Working Group therefore recommends a large-scale use of remote sensing technology in the agricultural insurance programme for timely settlement of claims including for on account payments, the introduction of new distribution channels like post offices and micro insurance agencies and the creation of a nationally consistent database with timely dissemination of information from crop-cutting-experiments and cleaning of historical data, etc.

### **Price Support Measures**

Ü MSP is a vital tool in helping farmers and consumers in achieving food security while extending remunerative prices to the farmers for their produce. However a number of modifications are needed to make the scheme more effective. These include:

- Extending MSP to all farmers, with broader crop coverage
- Decentralized procurement, with adequate provision of funds in advance
- Rationalization of State taxes
- Creating Revolving Fund to ensure timely availability of funds

Ü Recommendation on Market Intervention Scheme (MIS) include price fixation by an expert body, reimbursement based on actual losses and establishment of better linkages with the growing agro processing industry.

Ü Modification of the Price Stabilization Fund (meant for commodities like coffee, tea, rubber & tobacco) to include crop specific acreage based slabs, increase in crops covered, enhancement in the support amount, flexibility in farmers' deposits and linkages with crop insurance.

Ü Creation of a Credit Risk Management Fund model for plantation crops seeks to institutionalize the credit risk of farmers in the event of adverse price movement of plantation crops. It would involve a one time outlay of Rs.800 crores from the central government.

## **Emerging Commodity Markets**

Ü Commodity Derivatives markets have had a long history but have been recently reintroduced in India to benefit the farmer from price discovery and to protect him from adverse price fluctuation. Through commodity markets, farmers can hedge by taking a position in the futures market and insure against adverse fluctuations in prices in the physical market. However, due to the predominance of small and marginal farmers, lack of awareness and other restrictions, so far there is a negligible participation of Indian farmers in the commodity futures market. Creating conditions for rural farmers to access them is a challenge for agricultural policy planners. Some of the measures suggested to encourage the participation of farmers in the futures markets are:

- Encourage and allow banks, cooperative institutions, state marketing federations and Self-help Groups (SHGs), aggregators on behalf of the farmers in the futures market, as they have the requisite knowledge and operational skills needed to participate in the futures market.
- Banks, warehouses, exchanges, grading agencies, aggregators, insurance companies and farmers to form CUGs (Closed User Groups), to enable a smooth process flow.
- Government should permit options trading. Hedging through options is considered to be more beneficial to farmers, as compared to futures. Options involve one time premium payment, and farmers can gain, if prices move upwards while in a situation of downward moving prices, they are protected against losses.
- Warehousing infrastructure near the production centers must be upgraded and strengthened, while grading and standardization norms also need to be reviewed and enforced. The Warehousing Development and Regulation Bill, 2005 needs to be enacted without further delay.
- A more effective mechanism must be developed by Forward Markets Commission (FMC) to take timely measures, so that the prices are not allowed to fluctuate violently.

- Weather indices to be permitted for trading on the commodity exchange platforms. Today, indices are not permitted to be traded, as they are not considered to be commodities under the Forward Contracts Regulation Act (FCRA).
- APMC laws to be suitably amended, to allow private players to set up e-mandis, and to permit competition amongst the existing mandis. This would bring better processes, transparency and benefits to farmers.
- Price information should be made available at all places accessible to farmers. The Plan should make allocation for such electronic ticker boards in villages in a phased manner. Greater use of the agri-networks and call centers established by the Ministry of Agriculture, need to be encouraged for the purpose..
- Exchange terminals must be widely dispersed. Presently there are around 15,000 terminals, which need to be increased manifold to enable such transactions.
- Government to strengthen awareness campaign across the country on the commodity markets.

ü To cope and optimize the benefits of increasing global trade, India needs to move towards freer markets in a fair multi lateral trading system. Should such a system take time, the negotiation of regional FTAs could be considered, with parallel track preparedness. Domestic reforms would be the bulwark of enabling a strong presence in the global scenario for Indian agricultural products.

### **Contract Farming**

ü Contract farming is structural issue in terms of agriculture production and marketing. Its chief aim is to bring the management of agriculture in line with the best practices of agricultural production. The suggestions made in using contract farming as important risk mitigation tool are:

- Contract farming should be popularised as an alternative risk management

instrument.

- Facilitation of contract farming requires support in terms of changes in legislation e.g. APMC Act, mechanism to resolve conflict and providing quality control facilities.
- While designing flexible forms of pricing, combining insurance and futures as well, may make it more attractive to the farming community.
- Education, training and awareness building, on contract farming should be provided extensively to companies, government agencies as well as farming communities.
- The processor/procurer in the contract farming arrangement needs to be responsible for effective backward and forward linkages, keeping in view the interests of the farmers, as well as the business interest of the processor.
- The processor should provide the technology, planting material, credit and package of practices to the farmers
- Bio-fuel trees like Jatropha to be encouraged for higher farm incomes and rural energy security

### **Setting up a Centre for Risk Management in Agriculture**

Ü In an increasingly complex agricultural landscape, enhancing the efficacy and evolution of newer risk management tools is essential for the viability and sustainability of the sector. In this regard the Working Group recommends the establishment of a Centre for Risk management in Agriculture in Public -Private Partnership mode for research, capacity building and popularizing risk management solutions in agriculture.

# **1. Introduction**

## **Working Group on Risk Management in Agriculture for XI Five Year Plan (2007 – 2012)**

The Planning Commission vide communication Ref. no. M-12043/13/2006-Agri. Dated 28<sup>th</sup> June 2006, constituted a Working Group on Risk Management in Agriculture for formulation of the XI Five Year Plan (2007 – 2012), under the Chairmanship of Mr. R C A Jain, former Secretary (Agriculture & Cooperation), Govt. of India.

### **1.1. Terms of Reference**

The Terms of Reference of the Group are as under:

- (i) To examine the nature and types of risks in agriculture – traditional and modern ways of managing risks.
- (ii) To review efficacy and adequacy of existing risk management instruments (such as MSP, MIS, Futures market, Contract farming, NAIS, etc.) and to suggest appropriate and farmer friendly schemes for effective management of agricultural prices and production risks.
- (iii) To examine the potential for agri-insurance offerings and issues associated with demand and returns for related products. Examine trends and behavior and identify sectors that influence and stimulate demand for agri-business assurance.
- (iv) To examine relevant and proven international experiences to benefit from the best practices available globally.
- (v) To chart out a strategy/direction to reflect the diversified needs of the farming community and government policies, in the light of the emerging agri-insurance sector.
- (vi) To identify appropriate, profitable and sustainable target segments, for agri-business insurance product offerings and suggest a portfolio of products, which the insurance companies, should offer to identified customer segments.
- (vii) To suggest a suitable pricing approach and policy, appropriate distribution mechanism, suitable channel policies and effective promotional plan, for recommended product offerings.

- (viii) To suggest the basis for limiting/fixing, of the sum insured and the nature of coverage and indemnity levels.
- (ix) To explore financial support to Crop Insurance and define the possibilities for re-insurance.
- (x) To work out Management/Administrative arrangements for effective implementation of Crop Insurance –Public Private Participation – Other infrastructure.
- (xi) To suggest the structure of a business database and Management Information System (MIS), to continuously monitor and analyze factors, such as current customer needs, preferences, practices and the nature of competition.
- (xii) To review the present status of the National Agricultural Insurance Scheme (Modified Comprehensive Crop Insurance Scheme) and suggest measure for making the scheme more cost effective and beneficial to the farming community.
- (xiii) To review the suitability of various types of crop insurances – individual versus area based, single risk versus multi-risk insurance – rainfall versus all weather insurance and suggest a cost effective and beneficial Crop Insurance Scheme.

## **1.2. Meetings and Interactions**

The Working Group since its formation has met seven times: 11<sup>th</sup> July, 4<sup>th</sup> August, 8<sup>th</sup> September, 10<sup>th</sup> October, 1<sup>st</sup> November, 16<sup>th</sup> November and 13<sup>th</sup> December 2006. The Working Group in its first meeting constituted four sub-groups, the details of which are as follows:

**Sub Group (A):** ‘Insurance and Credit’ headed by Mr. G.C. Chaturvedi, Joint. Secretary, Ministry of Finance, Government of India.

**Sub Group (B):** ‘Prices, MSP and MIS’ headed by Dr. S.M. Jharwal, Principal Adviser, Ministry of Agriculture, Government of India.

**Sub Group (C):** ‘Production Risks, Disasters, Input Risk and Technology Risk’ headed by Mr. M Parshad, CMD, Agriculture Insurance Company of India Limited, and

**Sub Group (D):** ‘Markets, Futures, Contract Farming and International Trade’ headed by Mr. R.C.A. Jain, Chairman of the Working Group.

Each Sub Group had their own intensive discussions in several meetings and reported their findings to the Working Group contributing to the evolution of this Report.

The Working Group also co-opted 10 members, in addition to its original 33 members from different specializations.

### **1.3. Presentations**

The Working Group, in the course of its meetings organised presentations from experts and agencies, on important fields and issues in agriculture. The brief details of these presentations are as follows:

- (i) Status of Crop Insurance in India – Agriculture Insurance Company of India Ltd.
- (ii) Crop Insurance: Design & Rating Method of Area Yield Insurance–The World Bank
- (iii) Contract Farming – Prof. Gopal Naik, IIM Bangalore
- (iv) Contract Farming – PepsiCo India Ltd.
- (v) Contract Farming – Jain Irrigation Systems Ltd.
- (vi) International Trade – Dr Rajiv Mehta, CACP
- (vii) Commodity Markets - NCDEX
- (viii) Bio-Diesel Plants – Dr Paramathma, Tamilnadu Agriculture University
- (ix) Use of Remote Sensing Technology in Crop Insurance – RMSI
- (x) Medium Range Weather Forecasting Models – Prof. U C Mohanty, IIT Delhi
- (xi) Innovative Index Based Insurance Models – ICICI Lombard General Insurance Co.
- (xii) Managing Climate Risks – Prof. Siva Someshwar, IRI for Climate and Society
- (xiii) Transgenic Seeds and Issues – Monsanto Seeds
- (xiv) Agro-Meteorological Advisories – Mr. S C Bhan, Director, India Meteorological Department (IMD)
- (xv) Livestock Insurance – Prof. R K Parchure, National Insurance Academy (NIA)
- (xvi) Credit Risk Fund – Dr Rajasekharan, Chief of Kerala State Planning Board
- (xvii) Disaster Management in the context of Agriculture – Dr Vinay Sehgal, National Institute of Disaster Management (NIDM)

The Working Group made extensive use of statistical data available with the Agriculture Insurance Company of India Limited (AIC), and utilized the inputs of the Joint Group set up by the Ministry of Agriculture (GoI) in 2004, to make an extensive review of Crop Insurance. The Working Group has also benefited, from the findings of Technical Assistance provided to AIC by the World Bank recently, on design & pricing of ‘Area Yield’ insurance product. Similarly Chapter-2 (Risks in Agriculture) used inputs from “Managing Agricultural Production Risk – Innovations in Developing Countries”, World Bank (2005).

The Group also received inputs from ICICI Lombard General Insurance Company, IFFCO Tokio General Insurance Company and Agriculture Insurance Company of India Limited (AIC), particularly on weather insurance products.

This Report is the result of the collective efforts of the members of the Working Group. The Working Group gratefully acknowledges the inputs and guidance received from all stakeholders and wishes to thank all those, too numerous to be mentioned by name, who have contributed in the preparation of the Report.

This Report is being submitted by the Working Group, with the hope that its recommendations and the initiatives suggested, will find acceptance by the Planning Commission and the relevant Ministries and Departments of Government of India, committed to the cause of mitigating risks to insulate farm incomes and food security from periodic shocks.

#### **1.4. Chapter Plan**

Chapter 2 of the report discusses various risks in agriculture and the formal and informal mechanisms in dealing with these risks. Chapter 3 begins with an overview of climatic risks and the status of early warning systems for natural disasters. Chapter 4 reviews and provides specific recommendations in the areas of crop insurance, farm income insurance, livestock insurance and other insurance products.. National Agricultural Insurance Scheme (NAIS) has been reviewed with the purpose of making it more effective and affordable to the farmer

during XI Plan period and beyond. The chapter also deals with risk transfer mechanism, actuarial regime & public-private partnership in crop insurance. The chapter also works out the government's financial implications for the XI Plan Period. Chapter 5 explores the potential applications of remote sensing technology, insurance delivery services and the need for having a nationally consistent database for agriculture insurance. Chapter 6 looks at existing price support measures like Minimum Support Prices (MSP), Market Intervention Scheme (MIS), Price Stabilization Fund (PSF), Credit Risk Fund (CRF) and makes recommendations for improving these mechanisms. Chapter 7, while discussing the emerging commodity markets in the country, makes comprehensive suggestions in making these markets as effective tool for price risk management in the country. Chapter 8 espouses contract farming, as an important price risk mitigation strategy, while arguing for a regulatory & developmental regime for ensuring a level playing field for the farmers. Chapter 9 makes recommendation for setting up a Centre for Risk Management in Agriculture for capacity building and research to develop an inventory of risk management tools in the agriculture sector.

## **2. Risks in Agriculture**

### **2.1. Overview.**

The enterprise of agriculture is subject to a great many uncertainties. Yet, more people in India earn their livelihood from this sector, than from all other economic sectors put together. In rural India, households that depend on income from agriculture (either self-employed or as agricultural labour), accounted for nearly 70% of the population (estimates from Survey of Consumption Expenditures, National Sample Survey, 1999/00). Seventy five percent of all rural poor, are in households that are dependent on agriculture, in some way or other. Households that were self-employed in agriculture, account for 28% of all rural poor, while households that were primarily dependent on agriculture as labour, account for 47% of all rural poor.

Agricultural risk is associated with negative outcomes that stem from imperfectly predictable biological, climatic, and price variables. These variables include natural adversities (for example, pests and diseases) and climatic factors not within the control of the farmers. They also include adverse changes in both input and output prices. To set the stage for the discussion on how to deal with risk in agriculture, it's essential that the different sources of risk that affect agriculture are classified.

### **2.2. Types of Risk**

#### **(i) Production risk:**

Agriculture is often characterized by high variability of production outcomes or, production risk. Unlike most other entrepreneurs, farmers are not able to predict with certainty the amount of output that the production process will yield due to external factors such as weather, pests, and diseases. Farmers can also be hindered by adverse events during harvesting or threshing that may result in production losses.

#### **(ii) Price or Market risk:**

Input and output price volatility is important source of market risk in agriculture. Prices of agricultural commodities are extremely volatile. Output price variability originates

from both endogenous and exogenous market shocks. Segmented agricultural markets will be influenced mainly by local supply and demand conditions, while more globally integrated markets will be significantly affected by international production dynamics. In local markets, price risk is sometimes mitigated by the “natural hedge” effect in which an increase (decrease) in annual production tends to decrease (increase) output price (though not necessarily farmers’ revenues). In integrated markets, a reduction in prices is generally not correlated with local supply conditions and therefore price shocks may affect producers in a more significant way. Another kind of market risk arises in the process of delivering production to the marketplace. The inability to deliver perishable products to the right market at the right time can impair the efforts of producers. The lack of infrastructure and well-developed markets make this a significant source of risk.

**(iii) Financial & Credit risk:**

The ways businesses finance their activities is a major concern for many economic enterprises. In this respect, agriculture also has its own peculiarities. Many agricultural production cycles stretch over long periods of time, and farmers must anticipate expenses that they will only be able to recuperate once the product is marketed. This leads to potential cash flow problems exacerbated by lack of access to insurance services, credit and the high cost of borrowing. These problems can be classified as financial risk.

**(iv) Institutional risk:**

Another important source of uncertainty for farmers is institutional risk, generated by unexpected changes in regulations that influence farmers’ activities. Changes in regulations, financial services, level of price or income support payments and subsidies can significantly alter the profitability of farming activities. This is particularly true for import/export regimes and for dedicated support schemes, but it is also important in the case of sanitary and phyto-sanitary regulations that can restrict the activity of producers and impose costs on producers.

**(v) Technology risk:**

Like most other entrepreneurs, farmers are responsible for all the consequences of their activities. Adoption of new technologies in modernizing agriculture such as in introduction of genetically modified crops causes an increase in producer liability risk.

**(vi) Personal risk:**

Finally, agricultural households, as any other economic entrepreneur, are exposed to personal risks affecting the life and the wellbeing of people who work on the farm, as also asset risks from floods, cyclones and droughts and possible damage or theft of production equipment and any other farming assets.

**2.3. Risk Management Strategies:**

In discussing how to design appropriate risk management policies, it is useful to understand strategies and mechanisms used by producers to deal with risk, and for the purpose of this discussion to distinguish between informal and formal risk management mechanisms and between ex ante and ex post strategies. As highlighted in the 2000/2001 World Development Report (World Bank 2001), informal strategies are identified as “arrangements that involve individuals or households or such groups as communities or villages,” while formal arrangements are “market-based activities and publicly provided mechanisms.” The ex ante or ex post classification focuses on the point in time in which the reaction to risk takes place: prior to the occurrence of the potential harming event (ex ante) or after the event has occurred (ex post). Among the ex ante reactions, it can also be useful to highlight the differences between on-farm strategies and risk-sharing strategies. Table 1 summarizes these classifications.

**Table -1: Risk Management Strategies in Agriculture**

		<i>Informal Mechanisms</i>	<i>Formal Mechanisms</i>	
			<i>Market based</i>	<i>Publicly provided</i>
<b>Ex-Ante Strategies</b>	<i>On-farm</i>	<ul style="list-style-type: none"> <li>• Avoiding exposure to risk</li> <li>• Crop diversification and inter-cropping</li> <li>• Plot diversification</li> <li>• Mixed farming</li> <li>• Diversification of income source</li> <li>• Buffer stock accumulation of crops or liquid assets</li> <li>• Adoption of advanced cropping techniques (fertilization, irrigation, resistant varieties)</li> </ul>		<ul style="list-style-type: none"> <li>• Agricultural extension</li> <li>• Supply of quality seeds, inputs, etc</li> <li>• Pest management systems</li> <li>• Infrastructures (roads, dams, irrigation systems)</li> </ul>
	<i>Sharing risk with others</i>	<ul style="list-style-type: none"> <li>• Crop sharing</li> <li>• Sharing of agricultural equipment, irrigation sources, etc</li> <li>• Informal risk pool</li> </ul>	<ul style="list-style-type: none"> <li>• Contract marketing</li> <li>• futures contracts</li> <li>• Insurance</li> </ul>	
<b>Ex-Post Strategies</b>	<i>Coping with shocks</i>	<ul style="list-style-type: none"> <li>• Reduced consumption patterns</li> <li>• Deferred / low key social &amp; family functions</li> <li>• Sale of assets</li> <li>• Migration</li> <li>• Reallocation of labor</li> <li>• Mutual aid</li> </ul>	<ul style="list-style-type: none"> <li>• Credit</li> </ul>	<ul style="list-style-type: none"> <li>• Social assistance (calamity relief, food-for-work, etc)</li> <li>• Rescheduling loans</li> <li>• Agricultural insurance</li> <li>• Relaxations in grain procurement procedures</li> <li>• Supply of fodder</li> <li>• Cash transfer</li> </ul>

**2.3.1. Informal mechanisms:**

Ex ante informal strategies are characterized by diversification of income sources and choice of agricultural production strategy. One strategy producers can employ is simply to avoid risk. In many cases, extreme poverty makes people very risk averse, often avoiding activities that entail risk but that could also bring larger income gains. This

inability to manage risk and accumulate and retain wealth is sometimes referred to as the “the poverty trap”.

Once farmers have decided to engage in farming activities, the production strategy selected is an important means of mitigating the risk of crop failure. Traditional cropping systems in many places rely on crop diversification and mixed farming. Crop diversification and intercropping systems are means to reduce the risk of crop failure due to adverse weather events, crop pest or insect attacks. Studies present evidence that households whose consumption levels are close to subsistence (and are therefore highly vulnerable to income shocks) devote a larger share of land to safer, traditional varieties of rice and other cereals than to riskier, high-yielding varieties. Studies also present evidence that near-subsistence households spatially diversify their plots to reduce the impact of weather shocks that vary by location.

Apart from altering agricultural production strategies, households also smooth income by diversifying income sources and thus minimizing the effect of a negative shock to any one of them. According to the study conducted by the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), most rural households in villages of semi-arid India surveyed generate income from at least two different sources; typically crop income and some livestock or dairy income. Off-farm seasonal labor, trade and sale of handicrafts are also common income sources. The importance of income source diversification as part of risk management is emphasized by many studies, finding that households with more farm profit volatility are more likely to have a household member engaged in steady wage employment.

Buffer stock accumulation of crops or liquid assets, and the use of credit present obvious means for households to smooth consumption. Studies also show that currency and crop inventories function as buffers or precautionary savings.

Crop-sharing arrangements in land renting and labor hiring can also provide an effective way of sharing risks between individuals, thus reducing producer risk exposure. Other

risk sharing mechanisms, such as community-level risk pooling, occur in specific communities or extended households where members of the group transfer resources among themselves in order to rebalance marginal utilities. These kinds of arrangements are effective for counterbalancing consequences of events that affect some members of the community, but do not work well in cases of covariate income shocks.

Ex post informal income-smoothing mechanisms are typically the sale of assets, such as land or livestock, or reallocation of labor resources to off-farm labor activities, deferred / low key family functions, reduced consumption patterns, migration. It is reported in studies that southern Indian farmers are able to quickly shift from 100 per cent on-farm labor activities to largely off-farm activities if the monsoon rains are expected to be poor. Studies in India and elsewhere, reported considerable efficiency losses associated with risk mitigation, typically due to lack of specialization — in other words, farmers trade off income variability with profitability.

The need to smooth consumption not only against idiosyncratic shocks, but also against correlated shocks comes at a serious cost in terms of production efficiency and reduced profits, thus lowering the overall level of consumption of the household. A major consideration for innovation would be to shift correlated risk from rural households. An obvious solution is for rural households to engage in risk sharing with households or institutions from areas largely uncorrelated with the local risk conditions. Examples of such extra-regional risk sharing systems are found in the literature, for example, through credit and transfers with distant relatives; through migration and marriages; or through ethnic networks.

Although there is some degree of risk sharing and thus of insurance against weather, none of the systems are so widespread that they cover all households, nor are they even close to providing a fully efficient insurance mechanism. Most households are therefore still left with no insurance against correlated risks, the main source of which is weather.

### **2.3.2. Formal mechanisms:**

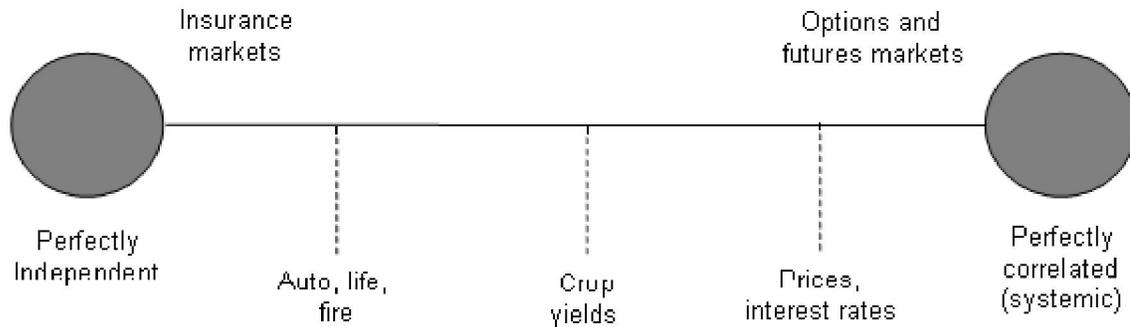
Formal risk management mechanisms can be classified as publicly provided or market based (Table-1). Government action plays an important role in agricultural risk management both ex ante and ex post. Ex ante education and services provided by agricultural extension help familiarize producers with the consequences of risk and help them adopt strategies to deal with risk. Supply of quality agricultural inputs is another institutional strategy. Governments also reduce the impacts of risk by developing relevant infrastructure and by adopting social schemes and cash transfers for relief after shocks have occurred

As mentioned earlier, production and market risks probably have the largest impact on agricultural producers. Various market-based risk management solutions have been developed in order to address these sources of risk.

#### ***2.3.2.1. Production/Weather Risk Management***

Insurance is another formal mechanism used in many countries to share production risks. However, insurance is not as efficient in managing production risk as derivative markets are for price risks. Price risk is highly spatially correlated and, as illustrated by Figure-1 below futures and options are appropriate instruments to deal with spatially correlated risks. In contrast, insurance is an appropriate risk management solution for independent risks. Agricultural production risks typically lack sufficient spatial correlation to be effectively hedged using only exchange-traded futures or options instruments. At the same time, agricultural production risks are generally not perfectly spatially independent and therefore insurance markets do not work at their best. Experts refer to these risks as “in-between” risks. According to economists, “good or bad weather may have similar effects on all farmers in adjoining areas” and, consequently, “the law of large numbers, on which premium and indemnity calculations are based, breaks down.” In fact, positive spatial correlation in losses limits the risk reduction that can be obtained by pooling risks from different geographical areas. This increases the variance in indemnities paid by insurers. In general, the more the losses are positively correlated, the less efficient traditional insurance is as a risk-transfer mechanism.

**Figure 1: Independent versus correlated risk**



(Source: Managing Agricultural Production Risk – Innovations in Developing Countries, the World Bank (2005))

Lack of statistical independence is not the only problem with insurance in agriculture. Another set of problems is related to asymmetric information — a situation that exists when the insured has more knowledge about his/her own risk profile than does the insurer. Asymmetric information causes two problems: adverse selection and moral hazard. In the case of adverse selection, farmers have better knowledge than the insurer about the probability distribution of losses. Thus, the farmers have the privileged situation of being able to discern whether or not the insurance premium accurately reflects the risk they face. Consequently, only farmers that bear greater risks will purchase the coverage, generating an imbalance between indemnities paid and premiums collected. Moral hazard is another problem that lies within the incentive structure of the relationship between the insurer and the insured. After entering the contract, the farmer's incentives to take proper care of the crop diminish, while the insurer has limited effective means to monitor the eventual hazardous behavior of the farmer. This might also result in greater losses for the insurer.

Agricultural insurance is often characterized by high administrative costs. These costs are high, in part, due to the risk classification and monitoring systems that must be put in place to address asymmetric information problems. Other costs are associated with

acquiring the data needed to establish accurate premium rates and conducting claims adjustment. However, Indian area yield insurance program is designed in such a way that the administrative costs are minimal due to the involvement of multiple agencies and credit link.

#### ***2.3.2.2. Price Risk Management***

One way producers have traditionally managed price variability is by entering into pre-harvest agreements that set a specific price for future delivery. These arrangements are known as forward contracts and allow producers to lock in a certain price, thus reducing risk, but also foregoing the possibility of benefiting from positive price deviations. In specific markets, and for specific products, these kinds of arrangements have evolved into futures contracts, traded on regulated exchanges on the basis of specific trading rules and for specific standardized products. This reduces some of the risks associated with forward contracting (for example, default). A further evolution in hedging opportunities for farmers has been the development of price options that represent a price guarantee that allows producers to benefit from a floor price but also from the possibility of taking advantage of positive price changes. With price options, agents pay a premium to purchase a contract that gives them the right (but not the obligation) to sell futures contracts at a specified price. Futures and options contracts can be effective price risk management tools. They are also important price discovery devices and market trend indicators.

As yet, private mechanisms that offer insurance against price risks, are limited. Futures markets have a long history in India. However, non-conducive government regulations and extensive government intervention, in the major commodities, have limited the scope to minor commodities, in the last three decades. Recent policy changes are more permissive of futures markets. However, world over, the principal benefits of futures are indirect: from price discovery and helping to manage price risk.

In Indian markets, price oscillations, such as cobweb cycles are often seen. Commodities traded in world markets, are also subject to such price variability. The problem of

matching supply to demand, requires coordinated actions amongst producers. Such coordination can arise from the dissemination of market information and price discovery mechanisms. Price support mechanisms have been limited to some regions only. In most cases, farmers face a serious price risk, because of the immediate necessity to dispose of stocks for want of storage, as also to repay loans.

Contract marketing / farming is an important price risk mitigation tool, becoming popular in the country and should play an important role during the XI Plan period. Contract farming also has many more direct benign impacts on farm incomes. Market risks are large in specialty crops and vegetables that deter most farmers from investing in them. Through price insurance, credit and technological inputs, contract farming could be an important mechanism by which small farmers can supply high value crops to urban and international markets, while benefiting from assured higher incomes.

### **3. Climate Variability and Change**

#### **3.1. Climate Risks:**

The impact of climate variability and change on food and agriculture in different agro-climatic systems and the changes in risk management approaches have shaped the mitigation and the response strategies of farmers and societies over millennia. Hydro-meteorological risks such as droughts, cyclones and floods not only endanger human lives and property, but also have a devastating impact on food production and farmers' livelihood systems. Farm communities that do not have inbuilt buffering mechanisms, as in resource poor rain-fed regions, are disproportionately vulnerable to the severity of extreme climate events.

Climate change further compounds the problem, as it threatens to alter the frequency, severity and complexity of climate events, as also the vulnerability of high-risk regions in different parts of the country. In recent years, there has been a dramatic technological progress in the understanding of climate systems, as well as in monitoring and forecasting weather events on the scale of seasons and beyond. The advent of more reliable forecasts goes hand-in-hand with emerging trends in risk management, where reactive strategies are gradually being replaced with more anticipatory, proactive and forward looking approaches. These approaches provide a unique opportunity to mitigate and reduce the vulnerability to adverse weather and climate phenomena, as also to take advantage of the knowledge of anticipated events to improve the quality of life of farmers. Widespread concerns on the likely impact of emerging climate risks, including those due to human induced actions on the climate system, provide opportunities to translate climate change adaptation concepts, into locally actionable practices. Potential opportunities also exist, to understand and make use of the patterns of climate variability, through skilful use of past observed climate data source in the country, though with a caveat that in climate science, the future is not always a mirror of the past.

#### **3.2. Challenges in Climate Variability**

There are, however, formidable challenges in making use of climate forecast technologies and information, for societal benefits. Some of the major barriers are:

(i). Most of the climate information products and tools scientists have developed for risk management are not fully utilized. This is partly because, we are still developing institutional, economic and cultural frameworks, within which decisions are made in any society. Further, decision makers frequently do not actively seek new technologies and sources of information or initiate contacts with experts who could be helpful in making more informed decisions.

(ii). While capacities to generate most of the climate information products rest with advanced global climate research centres, the need and demand for these products lies within local at-risk communities.

(iii). The uncertainties associated with climate change as well as socio-economic scenarios, in the next 100 years and beyond do not lend urgency to efforts, in mainstreaming climate change adaptation options into the immediate development planning process.

(iv). The financial and managerial constraints in developing appropriate interventions to spread, share and master the climate and other risks in agriculture, seriously undermine the benefits of technological breakthroughs in climate forecasting.

Like all knowledge intensive processes the use of climate information requires national and local institutions, with a capacity to interpret and effectively disseminate probabilistic climate information products, to match needs. Recent experiences in the use of climate information in the country, to anticipate and manage risks in agriculture, provide useful insights. Agriculture is at the heart of risks associated with Climate Variability and Change and its centrality should be recognized, in mitigating and adapting to their effects. Climate change mitigation and adaptation measures should therefore be integrated into the country's Five Year Plans and its poverty reduction strategies

### **3.3. Drought Risk**

Drought is a normal feature of India's climate. Droughts of varying, magnitudes, intensities, duration and geographical spread, have haunted India, over centuries. During the period 1871-2002, there were 23 major drought years, defined as years with All India

Seasonal Monsoon Rainfall (AISMR) less than one standard deviation below the mean (i.e. anomaly below -10%): 1871,1873, 1877, 1899, 1901, 1904, 1905, 1911, 1918, 1920, 1941, 1951, 1965, 1966, 1968, 1972, 1974, 1979, 1982, 1985, 1986, 1987 and 2002.

Despite significant developments in terms of increased areas under irrigation , better crop management practices, enhanced outlays for rural development programmes etc., the most recent major drought in 2002,inter alia, exposed country's continued vulnerability to droughts.

The steep fall in foodgrain production was to the extent of 29 million tonnes in 2002. no other major droughts in the past caused a reduction to this extent. Cropped area left unsown during Kharif season, due to drought was around 18.53 million ha., and 47 million hectares of the cropped area, was damaged.In spite of around 43% area under irrigation during Rabi 2002-03, the fall in Rabi output was around 8%.which is one of the largest reductions during rabi, in comparison to major earlier drought years.

Around 150 million cattle were affected, due to the lack of fodder and water. Fodder prices went beyond the reach of cattle breeders, during November 2002 – February 2003 and peaked again in May-June 2003, despite large scale fodder transport.

The total loss in rural employment due to the shrinkage of agricultural operations, was estimated at 125 crore man-days. The gross domestic product in agriculture shrank by 3.1%. The loss of agriculture income was estimated to be around Rs. 39,000 crores.

A multi-institutional drought early warning system exists in the country, to monitor the behaviour of the agro-climate indicators like rainfall, temperature, reservoirs levels and crop conditions, on a weekly basis from June to September. This early warning system called the 'Crop Weather Watch Group', enables the Government to intervene in July-August itself, instead of waiting for an assessment of the damage at the end of the cropping season (October- November). The country has a well-established drought response machinery at the national, state, district and village levels, with institutional mechanisms, to integrate the participation of political and civil society organizations.

From an economic perspective, 'agricultural drought' may be viewed as an exogenous, supply-side shock, which is widely recognised as resulting directly in sharp reductions in agricultural production and employment apart from other losses associated with declines in rural income. In addition, meteorological drought, may result in hydrological conditions that have a direct impact on non-agricultural production, including hydro-electric power generation and drinking water supply.

### **3.3.1. Moving to Climate Variability Management**

Drought 2002 management experience reveals that while India's ability to spare and mobilize resources to tackle drought emergencies increased, farm-level vulnerability in the arid/semi arid dry regions persists. Though current drought management practices rely on large scale resource transfer of income, food, water and fodder, to the drought affected areas physical, economic, and social vulnerability to drought in marginal ecosystems, of the arid and semiarid regions, is still a major concern in India's development planning.

Climate risk variability and drought, are two distinct but inter-related concepts. Drought denotes the extreme and negative impact of climate and weather. Climate variability, denotes both the positive and negative impact dimensions, of climate and weather. Climate variability captures disasters, abundance and the adaptations of the society. Understanding human system tolerance to climate variability, is equally valuable when the impact threshold has been exceeded, resulting in the manifestation of drought.

Rainfall variability i.e., annual, seasonal and sub-seasonal periodicities (seasonal fluctuations), could affect the established pattern of the livelihood system. Occasionally, coincidence of all dimensions of abnormalities of rainfall variability – annual, seasonal, sub-seasonal time frames, could result in severe droughts.

Farm households, particularly in the arid and semi-arid areas of India, routinely plan for and manage uncertainty, associated with regular seasonal fluctuations and drought induced crisis. That is, rural households - peasant, pastoral, artisan or labourers - do not manage drought in isolation, but as an integral dimension of their overall livelihood systems, which are designed to handle normal, unseasonal and drought years. In other words, while local communities manage climate variability in a holistic sense, often policy makers intervene and manage the negative consequences of climate variability, such as drought.

Traditional strategies rely on primary, secondary, and tertiary production systems of dry zones, to cope with droughts and seasonal fluctuations. These strategies have viable ingredients, compatible with the environment. Response systems have mechanisms to absorb the shock of drought and reduce drought impact. Although the primary production system (such as crops) may fail, secondary production systems (such as livestock), show resilience. The tertiary production system includes off-farm employment opportunities, that could provide near-immunity to the impact of drought.

Farmers' adjustment responses to rainfall variability were developed over several generations. More importantly, they historically evolved, in the context of a low-population, subsistence orientation of farming and agricultural practices. In the changed circumstances of today, with increased population pressure on land, the increased role of market forces and institutional and technological changes, the farmer's traditional strategies have been losing their efficacy in coping with drought. However, the traditional household response system, presents a rudimentary climate variability management model, and public policy makers should make use of its principles and practices, to build a sustainable livelihood system.

Primary and secondary production systems, may not be able to absorb the ever-increasing rural labour force, in the dry zones. Population pressure puts severe strains on the fragile ecosystems of dry zones, aggravates land degradation, and reduces the natural resource base that supports the livelihood in dry zones. This results in reduction in productivity, so

it is imperative to reduce the various pressures on the land. The climate variability model, emphasizes the need to facilitate the gradual transfer of large numbers of workers from farm, to non-farm jobs in high climate risk zones. By enhancing the value of agricultural raw materials, agro-based village industries will create employment and incomes, which will provide income security against drought. The tertiary production system, can also be geared to promoting local skills such as handloom work, handicrafts, and small-scale industries, that will provide greater income security.

By adopting a system approach to climate risk management in upgrading primary and secondary production systems, and by building up tertiary production systems, it is possible to transform current drought management methods from resource transfer, to resource regeneration. The climate variability approach is ecologically sound, socially acceptable, and economically beneficial. It will gradually phase out relief expenditure and promote sustainable development.

The decentralized climate risk management approach, by building up resources during the period of normal or above normal seasons, and draw down them to live through sub-normal or low rainfall years is the basic principle behind traditional livelihood practices to live with climate risks. The farmers of Rajasthan, used to build up food/ fodder reserves during normal years, anticipating subsequent 2-3 drought years depending on the locations. The near assured state interventions during drought emergencies in the last four decades, have made these practices redundant. The availability of local institutional structures such as Panchayat Raj Institutions, could be utilized to revitalize traditional climate variability management practices with appropriate modifications/ changes.

Pilot projects need to be undertaken to assess the requirements local organizations have, to appropriately fulfil their roles and/or to broaden their current mandates/roles. These pilot studies could be used to evolve policies to improve guidance and guidelines, on how local organizations in different settings could be strengthened and empowered to take on a more active role in the prevention, preparedness and management of recurrent droughts and institutionalize practical, situation specific “action models”, outlining

concrete steps and activities needed to strengthen mechanisms and measures for decentralized drought risk management. These should ideally be embedded, into the context of existing medium term development strategies in the regions.

The synthesis of several pilot studies and additional analysis of secondary source studies, could lead location specific guidance, and consolidate policy recommendations on how to institutionalize decentralized climate variability management systems, in the country.

Currently, the generated climate information products only cater to broad policy making at the macro level on the one hand, or are at the fine scale of the weather, on the other. As a result, the intermediary scaled climate events, ranging from several weeks to seasonal and inter-annual, important to a variety of climate-sensitive decisions and policies, are not being put to use for resource management at the community, local and state levels. This gap, needs to be addressed.

**3.3.2. Climate Prediction:** Contingency crop plan strategies have been evolved through research efforts since the mid 1970's, to minimize crop losses in the wake of aberrant weather conditions. Our experience in 2002, strikingly reveals that one of the major constraints in implementing contingency crop planning, is the lack of advance weather information during the kharif season, with reasonable lead-time and sufficient specificity, to enable farmers to modify their decisions before and during the cropping season. The break and active cycles of monsoon like the one experienced in 2002, affect farming operations in varying degrees almost every year in one part of the country or the other. This is of great significance, when we realise that 20-30% of the districts, suffer from deficient/ scanty rainfall, even in so called normal monsoon years.

Spatially and temporally differentiated weather information with a lead-time of 20-25 days, could be of value to policy planners and farmer service organizations, to provide critical agriculture input support services to farmers. For example, a forecast of the July 2002 monsoon break, made and disseminated to the agricultural community 25 days before the event, could have significantly minimized damage to agriculture during the

2002 monsoon season. Assuming that a prediction on the dry spell likelihood of July '02, was available by the first or second week of June 2002, farmers could have been motivated to postpone agricultural operations saving investments. Water resource managers, could have introduced water budgeting measures. Similarly, the prediction of the revival of the monsoon in August 2002, could have motivated farmers, to undertake contingency crop-planning during pre-rabi season.

The Department of Agriculture and Cooperation, has undertaken a commendable project on Extended Weather Prediction for Agriculture Risk Management, in collaboration with the Indian Institute of Technology (IIT), India Meteorological Department (IMD) and National Centre for Medium Range Weather Forecasting (NCMRWF), and other participating institutes. Substantial further progress is required, to enhance the capacity of the forecast institutions to provide downscaled prediction products with sufficient spatial and temporal resolution, to enable local level resource managers such as farmers, to make use of weather information for decision making purposes.

**3.3.2. Disseminating Climate Information:** India is one of the few countries possessing long term climatological records, spanning over 130 years. This rich climate database could be utilized to draw up patterns of climate risks, that could be used in drought management and mitigation planning. Some examples are discussed in the succeeding paragraphs.

Additionally, to generate farmer friendly weather information, there is a need to develop systems, which interpret, translate and communicate probabilistic forecast information to farm sector managers and end users and receive feedback with the active participation of State Governments / local institutions and civil society organizations. A continuous feed - back from end users of climate information, could help improve quality timeliness and relevance of weather information. The recent experiences in other countries, in using tools for communication could be utilized to evolve appropriate communication strategies, to reach improved weather information products to the farmers.

To sum up, there is a need to establish an end to end climate information generation and application system, with feedback mechanisms to connect end users and weather information providers, to make use of the latest advances needed to enhance downscaled predictions and utilization of past climate data, for planning drought management and mitigation practices.

In consonance with the adoption of a climate variability management approach, there is a need to redesign institutional arrangements, at the Local / District / State / National levels, with a capacity to track parameters relating to climate and the societal systems on a continuous basis regardless of occurrence of drought to guide policy making and programme implementation, so as to anticipate and manage climate risks, instead of responding to crisis situations.

### **3.4. Floods and Cyclones:**

#### **3.4.1. Early Warning Systems in India**

##### **(a) Flood Warning Systems in India:**

Flood forecasting and warning systems in India, complement structural flood management measures such as embankments and channels, which aim at minimizing flood damage and also better planning of rescue/relief operations. Scientific Flood Forecasting activities in India, commenced in 1958 for the Yamuna, and now cover almost all major flood prone inter-State river basins of India, with 173 flood forecasting stations in nine major river systems, and 71 river sub-basins in 15 states. The Central Water Commission (CWC) is in charge of these systems. For other intra-state rivers, states have to establish such systems, usually they are not in place.

Each year, CWC issues nearly 6,000 forecasts during the flood season, usually 12 to 48 hours in advance. For this, CWC has hydrological data from 700 Gauge and Discharge sites and hydro-meteorological data over 500 rain gauge stations, through a network of about 550 wireless stations. IMD provides synoptic weather reports, weather forecast/heavy rainfall warnings etc., to CWC. Flood forecasting systems have received support in each Five year Plan, to improve the systems needed, to issue more accurate

and timely warnings. There is a continuous need to improve, considering the large vulnerable population. Under the last plan, an additional 168 Telemetry Stations in different river basins were planned, with 8 modeling centers in five states, with hourly data transmission through VSAT.

Daily Flood Bulletins and special Flood Bulletins are issued during the flood season .In the 2005 monsoon, 158 level forecast bulletins and 122 inflow forecast bulletins were issued. In addition, 13 special Flood Bulletins were also issued. Over the last 2 decades, computerized mathematical models for forecast formulation were introduced. Currently, five hydrological models- SSARR, HECID, NIC, NAMSYSYSTEM-11 (MIKE-11) and CWCFI are used. Advanced technologies such as remote sensing and digital maps for flood risk zoning, are being developed under pilot projects.

#### **(b) Cyclone Warning Systems**

The India Meteorological Department (IMD), follows a four-stage warning system for issuing warnings for tropical cyclones. A "Pre-cyclone Watch" is issued whenever a depression forms over the Bay of Bengal or Arabian Sea, followed by a "Cyclone Alert", issued 2-3 days in advance of commencement of bad weather along the coast. In the third stage, Cyclone Warnings are issued 1-2 days in advance, which specify the expected place and time of landfall of the tropical cyclone. The final stage is known as "post-landfall Outlook", which is issued 12 hours in advanced of landfall and contains location specific forecast of landfall along with other warning details.

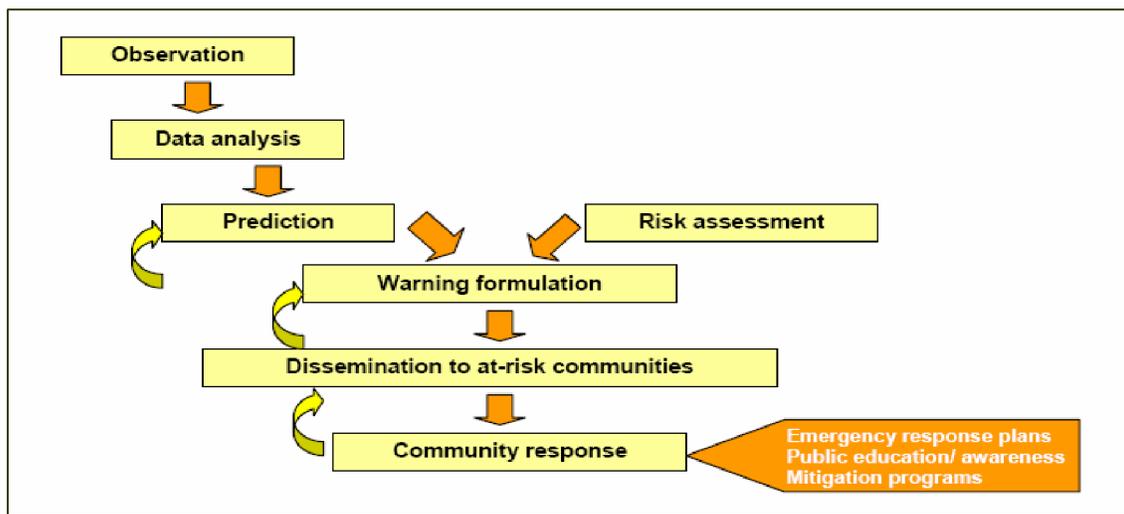
With new observation systems such as buoys, Doppler Radars and new generation satellites, these forecasts are likely to improve further. Four Doppler Weather Radars (DWRs) have started functioning along the east coast at Kolkata, Machilipatnam, Chennai and Sriharikota. A dedicated Indian geostationary meteorological satellite (Kalpana-1) was launched in September 2002, and is providing high resolution cloud imageries in the Visible, Infrared (IR) and Water Vapour channels. Similarly the INSAT -3A launched in April 2003, provides satellite imageries of 1 km resolution- all of which can contribute to better forecasts for severe weather hazards such as heavy rains and cyclones.

### 3.4.2. End-to-End warning system

A system that generates hazard information, constitutes one end and the system that delivers user focused information, to elicit a desired response from at risk communities, constitutes the other end of the system. Early warning information, effectively generated, communicated and applied, should lead to a change in decisions, that generate improved outcomes in the system of interest. This involves the following elements: the message to be communicated – weather/flood prediction and interpretation into local outlooks; the communication of the message – translation, message construction and dissemination; the receipt of and response to the message; and a feedback mechanism – examining the various aspects of the system with a view to improve its performance. Much more effort also needs to be applied to this end of the implementation chain, and pilot studies are recommended., as an integral part of policy planning. Figure-2 below depicts schematic End-To-End Early Warning System.

There are serious gaps in almost all phases of an early warning system: poor quality and less dense observation equipments, outmoded data analysis, poor prediction and risk assessment practices, non generation and poor dissemination of user friendly forecast products, both in their content and frequency, and understandably less or no participation of communities, in the early warning system. The gaps in different phases of the early warning system, naturally undermine the effectiveness of the system.

**Figure-2: End-To-End Early Warning System**



Courtesy ADPC

### **3.4.3. Areas for Improvement:**

In contrast to a problem-driven result from research commissioned by policymakers to meet a specific need, the availability of climate information is opportunity-driven – a product of pure science for use by society, including decision and policy makers. The challenge is the process of adoption, which includes issues of information packaging and communication, expectations from a new technology (spatial and temporal accuracy), adaptation to the local context, and users' needs considerations. Hence, prediction science research needs to be directed to risk concerns of communities. Agriculture community risk based early warning systems, with all inter-connected elements need to be established on the end-end early warning system framework. Surveys of all early warning systems, could reveal gaps for possible intervention.

Current systems are focused on saving lives which while very important, must recognize, that forecasts and warnings have to be specific and timely enough, to save livelihoods. This calls for improvement in technology to be able to provide higher resolution forecasts, also in the way forecasts are formulated and made use of. Specific skills for interpretation and effective dissemination of the technical warnings and the likely impacts of these hazards on various sectors such as agriculture, fisheries, small enterprises and other livelihood systems, needs immediate addressal. Simultaneously, disaster managers would need to have the requisite training and resources made available, to use these impact outlooks to develop and put in practice a specific contingency plan, that will not only save lives, but also the livelihood systems. This will keep the vulnerable population out of the vicious cycle of economic vulnerability, and thus, reduce the impact of these disasters.

This approach calls for across-the-board collaboration between the warning providers such as the NCMWF/ IMD and the CWC, and the intermediary users such as the various ministries and line departments- agriculture, fisheries, roads, etc., and effective dissemination practices, to arrive at favorable impacts for likely events. Past data which India already has very systematically, can be utilized. Preparedness and contingency plans can, be prepared at the local levels. The minor, but seriously flood prone rivers which are within a state, are not monitored by the center, and these cause large damage.

An inventory of such rivers could be prepared by the states, so that flood forecasting systems can be evolved, in a prioritized manner.

Tools and practices can be developed to interpret and translate forecast information, into impact outlooks for decision making in reducing disaster risks. Appropriate mechanisms, will then need to be evolved, to transfer these tools and practices to user institutions. This approach could be piloted in a few sites for different hazards such as riverine floods, flash floods, cyclones, storm surges, and based on the learnings and successes, it can be institutionalized in a nation-wide system. Pilot sites can establish a fully functional early warning system, reaching down to communities with demonstrable early warning information flow and feedback arrangements.

There is also a need to facilitate continuous interaction between warning providers, decision makers and end-users, so that there is a mechanism to obtain continuous feedback from users and decision-makers on the results of application of forecast information for disaster risk reduction. Private – public partnerships will enable localization and reduce the burden on government. Such a process will help continuous refinement and improvement of the entire end-to-end system.

#### **3.4.4. The Way Forward**

Improved weather forecasting and associated early warning systems, have immensely contributed immensely, to reducing fatalities due to floods and windstorms, despite the increase in their frequency. Though there is a decreasing trend in the number of fatalities since the late 1970s, an area of major concern is that response times within 48 hours could save a lot of lives. However, this range of lead time, is too short to protect livelihood assets such as crops, livestock and household assets. The impact of natural hazards on the rural livelihood system, has therefore, been a major concern.

National Center for Medium Range Weather Forecasts, has been generating weather information up to 5 days in recent years. Global climate centers, such as the National Center for Environmental Protection (NCEP/USNOAA), Center for Ocean-Land-

Atmosphere Studies (COLA), and the Climate Prediction Center of the US National Weather Service, provide medium range outlooks of precipitation and temperature, from 6-10 to 8-14 days into the future. The lead-time provided by these forecast products, is sufficient for decisions to preserve livelihoods. However, these products have been available only in the last 5-6 years, and applications have not yet been institutionalized, although attempts to use these in disaster management have been made.

With a lead-time of 5-7 days, the forecast is most useful in agriculture, water resource and disaster management. Specifically, the following application potentials have been identified:

- Timing of planting and harvesting
- Undertaking mid-season corrections and crop life-saving measures wherever possible
- Reducing harvest/ storage losses
- Protection of young seedlings/ crops from flood
- Protective measures to save assets and livestock
- Enabling farmers to preserve investments and retain capacity to undertake next cropping
- Planning flood response activities
- Precautionary measures to protect infrastructure (e.g. growth centers, food silos, embankments, etc.)
- Alternate water usage and buffering programs to provide water security

Warning and response systems are yet to take advantage of the 5-7 days lead time, provided by weather forecasts, to preserve livelihoods.

### **3.5. Catastrophe Protection for Non-Borrowing farmers**

Non-Borrowing farmers in the context of institutional credit sources, account for more than 50% of farmers. These non-borrowing farmers, who have limited recourse to institutional credit, have been largely left out of most of the governmental programs. At

present, government provides relief during extreme climate events, but the quantum of such relief is largely ad-hoc and limited. A great majority of farmers avail credit from money lenders, and are often led to the extreme step of committing suicide, if the crop fails for a season or two. In order to protect these non-borrowing farmers, from such drastic steps, the Group recommends introducing a ‘Catastrophe Protection’ for farmers. The protection operates in extreme circumstances of large scale crop losses, on account of weather conditions. Catastrophe Protection could give a framework to such compensation, by bringing it under a statute. The broad steps in operating Catastrophe Protection are:

- (i) Determining the scientific and practical criteria to measure catastrophes.
- (ii) The government to obtain international reinsurance cover to finance payments during catastrophe years.
- (iii) Determining the channel and ways of releasing the payments to beneficiary farmers affected by catastrophes.

Catastrophe payments to farmers are also practiced in other countries, including developed countries. The method of payment in USA, using insurance instrument is described below in the Box-1:

**Box-1: Catastrophe Risk Protection for Farmers in USA**

**Catastrophic Risk Protection (CAT) in USA**

Catastrophe Risk Protection in USA is the lowest level of Multiple Peril Crop Insurance (MPCI) coverage. Premiums for the CAT portion of all crop insurance policies are fully subsidized by the Federal government, although most farmers will pay an administrative fee for document processing. Farmers with limited resources may be eligible for a waiver of the administrative fee for CAT coverage. Any crop insurance agent can assist producers in determining if they are eligible for a fee waiver.

CAT is a 50/55 coverage, meaning the losses exceeding 50% are payable @ 55%. In other words, in the event of 100% of loss, CAT cover pays a maximum of 27.5% loss to the farmer (55% of 50% loss).

### **3.6. Bankruptcy Law**

In India, the law relating to bankruptcy and insolvency, is implemented under the provisions of the Provincial Insolvency Act, 1920 and the Presidency Towns Insolvency Act, 1909. The former Act is applicable to the insolvency proceedings in the Mofussil area, Tehsil and district. The latter act is applicable to solvency proceedings, in Presidency Towns only.

The procedural distinction between *bankruptcy* and *insolvency* is that insolvency proceedings are initiated and operated at the instance of a debtor who is unable to pay his debts or who has been imprisoned for indebtedness, whereas bankruptcy laws are put into action at the instance of the creditor. The distinction between bankruptcy and insolvency law, is blurred and it is difficult to define what belongs to one, and not to the other.

#### **Applicability to agricultural loans**

For agricultural lending, the law relating to insolvency as given in the Provincial Insolvency Act, will be applicable. The important provisions of the said Act are as under:

-U/S 3 of the Act, the District Court has jurisdiction under the Act. However, a State Govt. by notification, can invest powers to the Courts, subordinate to district court.

-U/S 6 of the Act, it provides for the actions and omissions, which can be treated as a committal of insolvency by the person.

Unlike industry, agriculture has no easy recourse to bankruptcy laws in our country. Consequently, farmers with substantial exposure in agriculture facing serious crop / income failure, are severely vulnerable, often quitting the profession, or taking the extreme step, of committing suicide. In order to save the farmer from such hopelessness and facilitate a turn-around, the Working Group recommends an examination of the bankruptcy law with a view to introducing suitable amendments, to provide succour to the farmers, in extreme situations.

## **4. Agricultural Insurance**

### **4.1. Introduction:**

The capacity of the agriculture sector, to hedge itself from the vagaries and aberrations of nature, is considered critical to its development and growth. Many factors, including disasters, can slow the development process, by reducing domestic food supplies and raw materials in the short term. Natural disasters such as drought, floods and cyclones are a major source of risk in agriculture. More than 2/3<sup>rd</sup> of the cropped acreage is vulnerable to drought, in different degrees. On an average, crops on 12 million ha. of land are damaged annually, by natural calamities and adverse seasonal conditions in the country, grossly impacting the level of agricultural productivity and production.

The insurance need for agriculture cannot be over emphasized, as it is a highly risky economic activity, on account of its critical dependence on weather conditions. To design and implement an appropriate insurance program for agriculture, is therefore a very complex and challenging task. The idea of crop insurance emerged in India, during the early part of the twentieth century. Yet, it was not operated in a significant way till the nineties. It is still evolving in terms of scope, spread and structure.

Crop insurance is a mechanism to protect farmers, against the uncertainties of crop production, due to natural factors, beyond farmer's control. It is also a financial mechanism, which minimizes the uncertainty of loss in crop production, by factoring in a large number of uncertainties, which impact crop yields distributing the loss burden. In a country like India, where crop production is subjected to the vagaries of weather and large-scale damage due to the attack of pests and diseases, crop insurance assumes a very vital role.

### **4.2. National Agricultural Insurance Scheme (NAIS)**

#### **4.2.(i). Crop Insurance as a Risk Management Tool:**

##### **Crop Insurance:**

Crop insurance is a means of “protecting the farmers against uncertainties of crop yields, arising out of practically all natural factors beyond their control”. It is a financial

mechanism in which the uncertainty of loss in crop yields, is minimized by pooling most uncertainties that impact crop yields, so that the burden of loss can be distributed.

Crop production involves numerous risks - natural, social, economic and personal. However, the principal characteristic, which distinguishes crop production from any other activity, is its great dependence on nature. Crop production unlike almost any other activity, has to be carried on in the face of continual uncertainties arising out of diverse natural and social elements. Normally, the greatest impact of all these elements falls on crops, which remain under the open skies for weeks and months.

Uncertainty of crop yield, is thus one of the basic risks, which every farmer has to face, more or less, in all countries, whether developed, or developing. These risks are particularly high, in developing countries particularly in the tropics as in most of these countries, the overwhelming majority of farmers are poor, with extremely limited means and resources. They cannot bear the risks of crop failure of a disastrous nature.

It is true that much of the present uncertainty of crop production in developing countries like India, could be removed by technical measures and by improvements in the social and institutional set-up. That a complete set of initiatives is needed in this regard, goes without saying. Still, a good deal of uncertainty will always be there, as no imaginable measure could make crop production completely independent of natural factors. Also, the physical measures envisioned, need to be justified by their cost-benefit ratio. There may be many places, for example, where flood is preventable, but the cost of prevention measures, would be far out of proportion to their benefit. In such cases, it would be bad economics to spend more capital in preventing a risk, than would be lost by the risk itself (especially where capital is so scarce). Secondly, with a growing population constantly pressing against land, no part of it could be given up for cultivation, simply because it is subject to periodical risks of failure. It is, as much in the country's interest, as in that of the individual owners that such lands should be kept under plough, even if there were occasional risks of failure.

Therefore, the risks of crop production have to be faced. However a serious crop failure has a cascading affect leading to serious repercussions, for the entire community. Various methods have been adopted for helping to compensate farmers , at least partially, for loss of their crops through natural calamities. Reduction or suspension of land rent, taxes, cancellation of accumulated agricultural debts (example of Rural & Agricultural Debt Relief Scheme, 1990), and relief from the Calamity Relief Fund (CRF) / National Calamity Contingency Fund (NCCF), are amongst the methods applied so far. Useful though these means have been, farmers cannot expect them as a right. Secondly, the continued prospects of relief, 'soften' its recipients and are also likely to be questioned by the non-farming community. An important measure that is largely free from the above difficulties, is crop insurance against all natural and unavoidable hazards.

#### **4.2.(ii). Crop Insurance – Types:**

Crop insurance may be of different types according to different criteria. The types as per criteria used could be:

##### **(a) According to Perils insured**

- Single Peril insurance: E.g.- Hail insurance
- Named Peril insurance: Up to four perils are covered
- Multi-Peril insurance: At least five or more perils are covered
- All Peril insurance: Covers all natural and non-preventable perils.

##### **(b) According to Object insured**

- Single crop insurance: A scheme covers a single crop, e.g. Apple insurance against hail & frost.
- Multiple crop insurance: A single scheme covers a host of crops, e.g. National Agricultural Insurance Scheme .

##### **(c)According to Basis of administration**

- Public insurance: Predominantly government run schemes
- Private insurance: Private insurers, without government support.
- Cooperative insurance: Both Government and private agencies are involved.

**(d) According to Scope & Application**

- Voluntary insurance: Scheme optional for states and / or farmers
- Compulsory insurance: Scheme compulsory for States and / or farmers.
- Optional local application of compulsory insurance: Scheme compulsory for certain crops grown in certain pockets.

**(e) According to Basis of Unit size**

- Individual farm basis: assessment & settlement of claims will be on individual farm / plot basis.
- Individual household approach: assessment & settlement of claims will be on household basis, covering all farms owned or cultivated by a farmer.
- Homogenous Area approach: assessment & settlement of claims will be on Area approach basis, covering groups of farmers growing crops under similar conditions.
- Combinations: A combination of farm/area based assessment, peril nature.

**4.2.(iii). Crop Insurance - Benefits and Constraints**

**(a). Benefits:**

Overall benefits of Crop Insurance could be summarized as follows:

- (i) Cushions the shock of disastrous crop loss, by assuring farmers a minimum of protection.
- (ii) Crop Insurance spreads the crop losses, over space and time. As agricultural income is an important factor in national income, crop insurance also has an effect on the prosperity of the country. It gives farmers greater confidence, in making greater investments in agriculture.
- (iii) It improves the position of farmers in relation to agricultural credit.
- (iv) Government is relieved of present uncertain financial burden of providing relief.
- (v) It can help normalize the availability of supplies and stabilize prices.
- (vi) It will help maintain the dignity of farmers.
- (vii) It enables maintenance of systematic records of crop production.

### **(b). Insurability of Risks:**

Not all risks are insurable. To be insurable, a risk must satisfy the following main criteria:

- (i) The probability of a loss in the future, should lend itself to estimation. This is possible only if reliable data of losses, is available for a sufficiently long period in the past.
- (ii) The loss must be capable of being estimated in financial terms.
- (iii) The probability of occurrence should not be too high, to make insurance unaffordable
- (iv) Occurrence of an event, or the damage it causes, should not be affected by the insured's behavior (Moral Hazard)
- (v) To the extent possible, the risk should be an 'Independent Risk'.

### **4.2.(iv). Evolution of Crop Insurance in the Country:**

Risk management in agriculture is a complex proposition. Agriculture, particularly prone to systemic and co-variate risk (a single risk affecting a large number of properties across large geographical regions), doesn't easily lend itself to insurance. Lack of past yield data, small sized farm holdings, low value crops and the relatively high cost of insurance, have further made it more difficult to design, a workable crop insurance scheme.

Despite these constraints, India debated the feasibility of crop insurance schemes, since independence. However, the first concrete attempt could be made only in the 1970s. The summary of schemes evolved till date, is as follows:

**(a) Scheme based on 'individual' approach (1972-1978):** The first ever scheme started on H-4 cotton in Gujarat, was extended later, to a few other crops & states. The scheme covered 3,110 farmers for a premium of Rs. 4.54 lakhs and paid claims of Rs. 37.88 lakhs.

**(b) Pilot Crop Insurance Scheme – PCIS (1979-1984):** PCIS was introduced on the basis of report of late Prof. V.M.Dandekar and was based on the 'Homogeneous Area' approach. The scheme covered food crops, oilseeds, cotton, & potato; and was confined to loanee farmers on a voluntary basis. The scheme was implemented in 13 states and covered 6.27 lakh farmers, for a premium of Rs. 196.95 lakhs and paid claims of Rs. 157.05 lakhs.

**(c) Comprehensive Crop Insurance Scheme – CCIS (1985-1999):** The scheme was an expansion of PCIS, and was made compulsory for loanee farmers. Premium rates were 2% of the sum insured for cereals & millets and 1% for pulses & oilseeds, with premium and claims, shared between the Centre & States, in 2:1 ratio. The scheme was implemented in 16 States & 2 UTs and covered 7.63 crore farmers, for a premium of Rs. 403.56 crores and paid claims of Rs. 2,319 crores.

**(d) National Agriculture Insurance Scheme –NAIS (1999):** NAIS was introduced during Rabi 1999-00, by improving the scope and content of the erstwhile CCIS. The salient features are as follows:

- (i) **States and Areas covered:** The Scheme is available to all States and Union Territories, on an optional basis. A State opting for the Scheme, will have to continue it, for a minimum period of three years.
- (ii) **Farmers covered:** All farmers including sharecroppers and tenant farmers, growing the notified crops in the notified areas, are eligible for coverage. The scheme is compulsory, for farmers availing crop production loans and voluntary for others.
- (iii) **Crops covered:** The Scheme covers
  - ✓ Food crops (Cereals, Millets & Pulses)
  - ✓ Oilseeds
  - ✓ Annual Commercial / Horticultural crops - sugarcane, cotton, potato, onion, chilly, turmeric, ginger, jute, tapioca, coriander, cumin, isabgol, fennel, fenugreek, annual banana, annual pineapple, etc. However, mangoes, apples, grapes and oranges are not yet covered.
- (iv) **Sum insured:** The minimum Sum Insured (SI) in case of loanee farmers, is the amount of loan availed, which can be further extended up to 150% of the average yield. For non-loanee farmers, it can be up to a value of 150% of the average yield.
- (v) **Premium Rates:** The premium rates are 3.5% for oilseeds & bajra and 2.5% for cereals, millets & pulses, during Kharif; in the Rabi season, they are :1.5% for wheat & 2% for other food crops and oilseeds. The rates for annual commercial / horticultural crops are **actuarial**.

- (vi) **Premium subsidy:** Small / Marginal farmers are subsidized in premium to the extent of 50 %, to be shared equally between the Centre & States. The premium subsidy is, however, to be phased out over a five year period, on a sunset basis. Accordingly, the eligible subsidy between 2004-07, is 10 percent.
- (vii) **Scheme approach:** The scheme covers losses from **sowing to harvesting**, and operates on an 'area approach' for **widespread calamities**. For this purpose, a unit of insurance(IU), is defined. It may be a Village Panchayat, Mandal, Hobli, Circle, Phirka, Block, Taluka, etc., to be decided by the State govt. / UT. However, each participating State govt. / UT, was required to reach the level of Village Panchayat, as the unit, within a maximum period of three years. The Scheme is to operate on '**individual**' basis for specified **localized calamities**. However, individual assessment of losses is currently researched in only in a few areas – one block / taluka in each state.
- (viii) **Loss assessment, Levels of Indemnity & Threshold Yield:** The Threshold Yield (TY) or Guaranteed Yield for a crop in a Insurance Unit, shall be the moving average yield based on the past three years, in case of Rice & Wheat, and five years yield, in case of other crops, multiplied by the level of indemnity. Three levels of Indemnity, viz., 90%, 80% and 60%, corresponding to Low Risk, Medium Risk & High Risk areas, will be available for all crops. The insured farmers of a unit area, may also opt for higher level of indemnity, on payment of an additional premium.
- (ix) If the 'Actual Yield' (AY) per hectare of the insured crop for the defined area falls short of the specified 'Threshold Yield' (TY), all the insured farmers growing that crop in the defined area, are deemed to have suffered a shortfall in their yield.
- (x) **Sharing of Risk:** Until transition is made to an actuarial regime, Govt. of India and States shall share claims beyond 100% of the premium collected, for food crops & oilseeds, on 50:50 basis. In case of annual commercial / horticultural crops, claims beyond 150% of premium in the first 3 or 5 years, and 200% thereafter, are borne by the Centre and State, on a 50:50 basis.

Till Rabi 2005-06, NAIS covered 79.16 million **farmers** for a premium of **Rs. 2,332.50 crores** and finalized claims of **Rs. 7,255.75 crores**. The season-wise coverage since its inception is given in Table 2 below:

**Table-2: National Agricultural Insurance Scheme (NAIS) – Season wise Coverage**

Season	No. of covered States/UTs	Farmers covered (millions)	Area covered (million ha)	Rs. Crores			Farmers Benefited
				Sum Insured	Premium	Claims	
<b>Kharif</b>							
2000	17	8.41	13.22	6903.38	206.73	1222.48	3635252
2001	20	8.70	12.89	7502.46	261.61	493.53	1741873
2002	21	9.77	15.53	9431.69	325.47	1824.31	4297155
2003	23	7.97	12.36	8114.13	283.33	649.88	1704823
2004	25	12.69	24.27	13170.49	458.94	1037.64	2660906
2005	25	12.67	20.53	13517.73	449.88	1010.65	2582250
<b>TOTAL</b>		<b>60.21</b>	<b>98.80</b>	<b>58639.88</b>	<b>1985.96</b>	<b>6238.49</b>	<b>16622259</b>
<b>Rabi</b>							
1999-00	9	0.58	0.78	356.41	5.42	7.69	55288
2000-01	18	2.09	3.11	1602.68	27.79	59.48	526697
2001-02	20	1.96	3.15	1497.51	30.15	64.65	453325
2002-03	21	2.33	4.04	1837.54	38.50	188.55	926408
2003-04	22	4.42	6.47	3049.49	64.06	490.67	2072916
2004-05	23	3.53	5.34	3774.21	75.85	160.59	772779
2005-06	23	4.04	7.22	5068.88	104.77	45.63	45226
<b>TOTAL</b>		<b>18.95</b>	<b>30.11</b>	<b>17186.72</b>	<b>346.54</b>	<b>1017.26</b>	<b>4852639</b>
<b>Grand Total</b>		<b>79.16</b>	<b>128.91</b>	<b>75826.60</b>	<b>2332.50</b>	<b>7255.75</b>	<b>21471898</b>
<b>Note: 2005-06 figures are provisional and do not include all claims</b>							

**Non-Loanee Participation and Adverse Selection:**

The participation of non-loanee farmers' in the NAIS, is mostly guided by the nature of the season. This resulted in poor participation during normal seasons and high participation during adverse seasons. Further, the non-loanee farmers' participation has come, from those areas and crops, which were most likely to report high crop losses. Their participation was predictably the highest, during adverse seasons. Based on coverage between 1999 and 2005, the loss cost for non-loanee farmers was a staggering 27 percent, compared to 9 percent for loanee farmers.

**4.2.(v). Crop Insurance Penetration:**

Crop Insurance to be a meaningful policy risk management tool, would have to reach out to a majority of farmers. The Group believes it to be a mammoth task, which could be achieved

only through an effective insurance program backed by adequate funding support from the Govt.

The Group also believes that crop insurance penetration is a gradual process and insuring up to at least 50% of all farmers would take time, that too, if aggressively supported by aggressive service delivery and awareness and image building programs. Considering the above, the Working Group proposes penetration targets in terms of farmers / acreage covered under insurance for the XI-Five Plan Period, as described in Table – 3 below:

**Table – 3**

<b>S.No</b>	<b>Year</b>	<b>Insurance Penetration (Cultivators)</b>	<b>Insurance Penetration (Acreage)</b>
1	2007-08	20% (24 millions)	38 million hectares
2	2008-09	25% (30 millions)	48 million hectares
3	2009-10	30% (36 millions)	58 million hectares
4	2010-11	35% (43 millions)	69 million hectares
5	2011-12	40% (50 millions)	80 million hectares

**4.2. (vi). National Agricultural Insurance Scheme (NAIS) - Fundamental Issues:**

The limited expansion in the scope and content of crop insurance, in the form of NAIS, did not measure up to the expectations of the farming community. The key issues for this, based on review, have been identified as follows:

1. The insurance unit is presently too large.
2. Guaranteed Yields do not reflect the reasonable aspirations of farmers.
3. The present indemnity levels are inadequate.
4. Inordinate delays in the settlement of claims.
5. Inadequate risk / loss coverage.
6. Poor infrastructure facilities for coverage of non-loanee farmers .
7. Insurance coverage is not available for Fruits, Vegetables etc.
8. Lack of composite insurance covering crops & other assets

**4.2.(vii). Actuarial Regime:**

The scheme is presently working on an administered rate regime, with the government financing both premia subsidy and claims. The Joint Group suggested placing the scheme, in

an actuarial regime, in which, the insurance company receives premium based on commercial rates and is responsible for all claims. It has advantages for all concerned –

1. risk transfer through international reinsurance
2. the government would be able to budget its expenditure accurately and at the beginning of the year, as it would relate to only premium subsidy;
3. the implementing agency has an incentive to be accountable and professional in administering the scheme;
4. farmers would receive claims early, with settlement by the implementing agency without having to wait for receipt of funds from the government.

Under the proposed arrangement, the government would decide the premium payable by the farmer, and the difference between the actuarial rates (charged at state level) and the rates payable by the farmer, would be borne by the government. The Joint Group recommended that the premium subsidy may range from 25% to 75% (subject to a maximum net premium of 8%), at different slabs of actuarial premium.

**Working Group, urges the government to consider channelising at least a portion of the agricultural relief and other related funds, through crop insurance, as the efficiency of government money spent is the highest through the insurance route.**

**(a) Premium Subsidy in an Actuarial Regime:**

The Working Group has examined the matter and would like to make the following suggestions in addition to the recommendations made by Joint Group:

- (a) Actuarial premium rates are to be applied at a District level, by micro managing the indemnity levels in an equitable manner, vis-à-vis the risk of each Insurance Unit (IU).
- (b) To the extent possible, irrigated and un-irrigated areas with respect to a crop, have to be notified separately, so as to charge premium rates, commensurate with the risk.
- (c) Crops with gross actuarial premium rates of 20% or more, may not be included in the actuarial regime. The government may also consider excluding such crops from the insurance net, and may provide support under catastrophe / relief programs.

- (d) In due course, an alternative to CCEs based yield estimates, has to be developed for getting accurate and timely yield reports, for processing claims.
- (e) The insurance product being of the nature of ‘safety net’ to the farmers in mitigating production risks, it is good that all crop insurance products could be exempted from service tax.
- (f) The Subsidy model suggested is given in Table-4 below:

**Table – 4: Premium subsidy model in Actuarial Regime**

S. No	Premium slab	Subsidy to farmers
1	Upto 2%	No Subsidy
2	>2 – 5%	30% subject to minimum net premium of 2.00%
3	>5 – 8%	40% subject to minimum net premium of 3.50%
4	>8 – 12%	50% subject to minimum net premium of 4.80%
5	>12% - 20%	60% subject to minimum net premium of 6.00%

**(b) Government as Reinsurer of last resort:**

Agriculture risks being co-variate in nature, the risk transfer mechanism gets costlier for transferring catastrophic risks to the private reinsurance market. The government, therefore, acts as the reinsurer of last resort for catastrophic losses, in most countries where crop insurance is largely supported by the government. Keeping in mind the above, as also considering that we have no historical experience with actuarial regime, the Working Group makes following recommendations:

1. Premium component equivalent to 20% of gross premium with matching contribution from the Central government may be set aside by AIC / insurance company as ‘catastrophic reserve’, so as to have readily available funds to meet the contingency.
2. Crops to be divided into two groups for the purpose of actuarial regime, say (i) viable lines (with matured loss history) and (ii) risky lines (with moderate to high loss history). While the insurance company would be responsible for all claims with reference to viable lines, the government would provide ‘stop loss’ arrangement for ‘risky lines’, beyond a claims ratio of 200%.
3. The Box-2 below discusses the reinsurance as a risk transfer mechanism, which could be utilized if and when the crop insurance is placed on actuarial regime.

## Box-2: Reinsurance Mechanism

Reinsurance is insurance for insurers. Just like insurance, reinsurance is “fundamentally the promise to pay possible future claims against a premium today.” Insurers often hold un-diversifiable or extreme risk in their portfolio and since they do not wish to retain all of it, they transfer part of these risks to reinsurance companies. Reinsurers are paid a premium for taking on a portion of the risk from insurers. Reinsurers also advise insurers on product development and more complex risk-taking.

Reinsurance agreements can be “proportional” or “non-proportional.” With “proportional” agreements insurers and reinsurers divide premiums and losses in a contractually defined proportion, while with “non-proportional” agreements the insurer usually pays all losses up to a defined amount and the reinsurer indemnifies for losses above that limit. “Quota-share” and “surplus” reinsurance are examples of proportional reinsurance agreements. “Excess of loss” and “stop loss” are examples of non-proportional reinsurance agreements. Reinsurers seek to operate across boundaries in order to build globally diversified portfolios. More than 250 reinsurers in 50 countries wrote annual reinsurance premiums of circa US\$176 billion in 2003.<sup>a</sup> Non-life reinsurance premiums accounted for US\$146 billion or circa 14 percent of the global non-life primary insurance industry. Only US\$25 billion of these premiums are written outside North America and Western Europe. The ten largest reinsurers write around 54 percent of reinsurance premiums, and the two giants in the business, Munich RE and Swiss RE, write around US\$49 billion of reinsurance premiums.

Securitization is an alternative to traditional reinsurance through which catastrophic risks are transferred to capital markets in the form of financial securities. Securitization has been used for natural catastrophe exposures, such as earthquake and hurricanes.

*Source: Swiss Re 2004.*

Table-5 below lists different risk transfer strategies with advantages and disadvantages and role of the government:

**Table-5: Risk-Transfer Strategies**

<b>Strategy</b>	<b>Advantages/Disadvantages</b>	<b>Role of Government</b>
<p><b><i>Direct risk transfer</i></b></p> <p>Contracts are transferred directly from insurers to reinsurers.</p>	<p>No basis risk. Pooling occurs at reinsurer level. If spatial diversification opportunities exist, reinsurance premium rates will likely be higher than if risks were pooled at insurer level (even if the reinsurer offers portfolio adjusted reinsurance premiums). Reinsurer will need to perform extensive due diligence on index but little due diligence on insurer.</p>	<p>Government is not involved in facilitating risk transfer.</p>

<p><b><i>Packaged risk transfer</i></b></p> <p>Contracts are bundled among companies and transferred to one (syndicate) of reinsurers.</p>	<p>Same as above only may pay lower reinsurance premium rates because bundling reduces transactions costs for the reinsurer.</p>	<p>Either government or an association of insurers can facilitate the bundling and transfer of contracts to the reinsurance market.</p>
<p><b><i>Pooling and transfer</i></b></p> <p>Contracts are pooled within the country and/or region with only the tail risk of the pool transferred to reinsurers.</p>	<p>Some basis risk. If spatial diversification opportunities exist, reinsurance premium rates will be lower than with other strategies. In the case of pool reinsurance based on traditional stop loss cover transactions costs may be higher since the reinsurer will need to perform due diligence not only on the index, but also on the pool. In case of reinsurance based on index insurance, pool due diligence is avoided, but basis risk would be higher</p>	<p>Either government or an association of insurers can facilitate the risk pooling and transfer of pool tail risk to the reinsurance market.</p>

Source: Managing Agricultural Production Risk – Innovations in Developing Countries (World Bank)

#### **4.2.(viii). Credit & Insurance Linkage:**

NAIS has a credit link, and hence appropriate controls in credit disbursement would come in handy in effective implementation of the scheme. For example, NAIS would require crop-wise, insurance unit-wise, season-wise and month-wise details of disbursement, as eligibility of claims would depend on these parameters. In other words, it would require that in the Kisan Credit Card (KCC), that the Maximum Borrowing Limit (MBL), should be fixed separately for ‘crop production credit’ and for ‘ancillary activities’. Within crop production credit, the limits have to be fixed season wise and crop wise, on the basis of acreage proposed and scales of finance. Most importantly the KCC holder at the time of borrowing/ withdrawing money from his account, should furnish the season and crop wise breakup, to enable the bank to correctly reflect insurance coverage. NAIS even after modifications in future, would have to draw heavily from credit controls exercised by bankers.

It has been suggested at many levels, that insurance coverage be de-linked from credit 'disbursement' not only to overcome operational difficulties, but also to minimize adverse selection. Any insurance link with actual disbursement, is only going to get more complex, as the banks are thinking of issuing ATM friendly 'credit cards', which could further reduce the 'banker-farmer' interaction.

The suggestion, is that insurance coverage be provided on the basis of maximum borrowing limit, instead of loan amount actually availed, which would otherwise require tracking down each installment with respect to season, crop, etc. This would also help to advance the cut-off dates for loanee farmers, at par with non-loanee farmers, and minimize adverse selection. It also has other benefits, like accurately recording insured acreage crop-wise. While the issue needs to be debated with the Financial Institutions and NABARD, to find an appropriate mechanism, the Group felt, that MBL could be fixed as the sum insured and insurance effected at the beginning of the crop season. The farmer would bear the responsibility, to communicate by 31st July (Kharif) and 31st December (Rabi), if the crops for which the credit limits have been fixed, have not been sown.. The insurance coverage provided based on MBL, would be treated as final, if no communication is received from the farmer by these dates. The Group suggests an insurance approach based on - (i) 'individual approach' and (ii) weather insurance model.

#### **4.2.(ix). Recommendations on Improvements:**

The Working Group also examined the suggestions made by the Joint Group (constituted by MoA in 2004) and reviewed the feed back. The Working Group after extensive review recommends the following improvements in the product design so as to make crop insurance farmer friendly and meaningful:

##### **(a) Reduction of insurance unit to the village panchayat level for major crops:**

As of now, the National Agricultural Insurance Scheme is implemented on the basis of "homogeneous area" approach, and the area (insurance unit) at present is the Taluka / Block or equivalent unit, in most instances. For the scheme to succeed, the approach would give

improved results, provided the yield variability within the area (insurance unit), is the least. However, considering that the present units are largely administrative, yields are hardly uniform within the unit. It is, therefore, felt that the insurance unit should be as small as possible. Ideally, an “Individual approach” would reflect crop losses on a realistic basis, and this would be most desirable. In Indian conditions, implementing a crop insurance scheme at the “individual farm unit level” is beset with problems, such as:

- a) Non availability of past record of land surveys, ownership, tenancy and yields at individual farm level
- b) Large number of farm holdings (nearly 11.6 Crores), with small farm holding sizes
- c) Remoteness of villages and inaccessibility of farm-holdings
- d) Large variety of crops, varied agro-climatic conditions and package of practices
- e) Simultaneous harvesting of crops, all over the country
- f) Cost and effort required in the collection of a small amount of premium, from a large number of farmers
- g) Prohibitive administrative costs and inadequate infrastructure

The Working Group feels that lowering the Insurance Unit (IU) to Gram Panchayat (GP), is a welcome move, in order to reflect yield losses at a reasonable level. However, data being the lifeblood of insurance, clearly the actuarial rating of the product at GP level, is possible only if the historical yield data at that level (GP) is available, for at least the past 10 years. Since, data at the GP level is not available, with most of the States and for most of the crops, it would be difficult for the insurer, to work out premium rates on sound actuarial principles.

The Working Group while supporting the reduction of Insurance Unit (IU), makes the following suggestions vis-à-vis premium rating ( GPs without historical data):

- (i) While the Insurance Unit (IU) could be lowered to GP, the actuarial premium would be charged based on the yield data of existing unit (tehsil / block / circle etc) and differences in claims, if any, between the existing unit and the GP level (on the basis of the yield estimates consolidated both at GP and existing unit), would be transferred to the Government. This may be continued, for 3 to 5 years.
- (ii) Based on the experience of these 3 to 5 years, a ‘correction factor’ could be worked out, and thereafter actuarial premium could be charged at the GP level, with full claims liability being borne by the insurer.

(iii) Alternatively, in order to avoid open-ended liability for the government, in the first 3 to 5 years, a 'premium fund' could be created for residual claims (difference between claims of existing unit and GP), based on a fair estimate and the fund would be maintained by the insurer for the government. The fund would be adjusted finally, at the end of the 3 to 5 year period and the balance settled.

**(b) Threshold Yield (Guaranteed Yield):**

Presently Guaranteed Yield, based on which indemnities are calculated, is the moving average yield of the preceding three years for rice and wheat, and five years for other crops, multiplied by the Level of Indemnity. The concept does not provide for adequate protection to farmers, especially in areas / crops with consecutive adverse seasonal conditions, pulling down the average yield. The Joint Group proposed the consideration of the best 5, out of the preceding 7 years.

The Working Group however, was of the considered opinion that an area-yield estimate is intended to reflect, what farmers in the area, can normally be expected to produce Hence, the inclusion of a few best years, from recent years of production records into an averaging time series methodology, is not likely be a good indicator of expected production in the future. It therefore, recommends a longer time series of 10 years in fixing Guaranteed Yield. This would reduce yearly coverage fluctuations, reduce the potential for adverse selection (i.e., farmers may adversely select against the insurance program by participating when coverage is high or not insuring when coverage is low), and avoid decline in farmers' satisfaction relating to inadequate coverage. In due course, de-trending of the yield data (considering the annual growth rates in productivity) and statistical smoothing, could be introduced.

**(c) Levels of Indemnity:**

At present, the levels of indemnity are 60%, 80% or 90% corresponding to high, medium & low risk areas. It is perceived that the 60% indemnity level, does not adequately cover risk, especially in the case of small / medium intensity adversities, as losses get covered only if and when, the loss exceeds 40%. The Joint Group has proposed only two levels of Indemnity, viz. 80% & 90% instead of the existing 3 levels, viz. 60% (high risk), 80% (medium risk) and 90% (low risk).

The Working Group feels that the suggestion of the Joint Group is reasonable, but, these higher levels of indemnity may escalate premium rates, and thus, increase the subsidy burden of the government. In view of this, it may be wise, to continue with the three levels, while upgrading 60% to 70%. Since, the majority of crops are presently under the 60% level, its up-gradation to 70%, is a reasonable improvement, particularly, when seen along with other improvements like lowering the Insurance Unit (IU), changes in threshold calculation, etc.

**(d) Extending risk coverage to prevented sowing / planting, in adverse seasonal conditions**

The existing scheme covers risk, only from sowing to harvesting. Many a time sowing / planting is prevented, due to adverse seasonal conditions and the farmer not only loses his initial investment, but also loses the opportunity value of the crop. The Joint Group felt that a situation where the farmer is prevented from even sowing the field, is a case of extreme hardship and this risk must be covered. As per the Joint Group, pre-sowing risk particularly prevented / failed sowing / reseeded on account of adverse seasonal conditions, would be covered, wherein up to 25% of sum insured could be paid as compensation, covering the input cost incurred till that stage.

The Working Group felt that the proposed improvement is laudable, but simultaneously, it is important to examine, whether this should be an 'add-on' benefit with the main cover, or an integral part of the main cover itself. The Working Group also felt, that payouts under this cover, should be largely parametric, using rainfall, sowing data and field reports.

**(e) Coverage of post harvest losses:**

In some states, crops like rice, are left in the field for drying post harvest. Quite often, this 'cut and spread' crop is damaged, by cyclones, floods, etc., especially in coastal areas. Since, the existing scheme covers risk only up to harvesting, these post-harvest risks are outside the purview of insurance. The Joint Group examined the issue in the light of difficulties in assessing such losses at an individual level, and recommended that the insurance cover may be made available to post harvest losses, only for those crops in coastal areas, which are

allowed to dry in the field after harvesting and should be against cyclonic rains only, and that the cover be for a maximum of two weeks.

The Working Group agreed with the broad recommendation made by the Joint Group, but felt that the assessment could be done on a 're-sampling' basis, instead of an 'individual' basis. In 're-sampling', the affected area within the insurance unit would be segregated, and re-sampled for CCEs, using the earlier sampled plots, with additional plots based on the same sampling method.

**(f) Compulsory nature of Scheme:**

The existing scheme is compulsory for farmers who avail loans for raising insurable / notified crops in states where the scheme is implemented. On account of the high premium rates, for certain annual commercial / horticultural crops, and certain areas and crops for which no claims have been received, largely due to good crops, there has been a suggestion to make the scheme voluntary. The idea was to leave the decision of participation to farmers. The Working Group, however feels that considering crop insurance awareness in the country is low, and that the scheme is highly subsidized, it should continue to be compulsory for all loanee farmers. Mandatory insurance also encourages banks to lend more in the agriculture sector.

**(g) Uniform seasonality discipline for participation in the scheme:**

The Working Group was in agreement with the Joint Group, w.r.t. uniform cut-off dates / sign-up dates, for loanee and non-loanee farmers. These cut-off dates could be between 15<sup>th</sup> June – 15<sup>th</sup> July for Kharif crops in different states; 30<sup>th</sup> November - 31<sup>st</sup> December for Rabi and 31<sup>st</sup> January for Summer crops. In case of Kharif crops, the cut-off dates are to be fixed in such a way, that these dates correspond to historical onset / covering by SW Monsoon.

The Working Group further agreed with the Joint Group w.r.t. the following modalities:

1. Non-loanee farmers can avail insurance before sowing, on the basis of the crop which the farmer intends to sow. In case of change in the crop or other exigencies, the farmer should communicate to the Bank / institution, where the proposal was

submitted originally, accompanied by a certificate of sowing of the alternate crop from the village administration.

2. For loanee farmers, coverage be provided on the basis of the loan amount sanctioned / Maximum Borrowing Limit (MBL), by the credit agency. The basis of sanction of the loan is the total landholding, the nature of crops grown and the scale of finance.

The Working Group strongly felt that this is a very important suggestion, to minimize inter-temporal adverse selection problems (i.e. farmers buy insurance only when they may face large crop yield losses). What may also be considered, is to charge differential premia, for different sign up dates.

**(h) On-account settlement of claims:**

Claims' processing in NAIS begins only after the harvest of the crop. Further, claim payments have to wait for the results of CCEs and also for the release of requisite funds from the Centre and States. Consequently, there is a gap of 8-10 months, between the occurrence of loss and actual claim payment. To expedite the settlement of claims in case of adverse seasonal conditions, and to ensure that at least part of the likely claims receivable are paid to the farmer, before the end of the season, the Joint Group recommended that 'on-account' settlement of claims be done, without waiting for receipt of yield data, to an extent of 50 percent of likely claims, subject to adjustment against the claims assessed on a yield basis.

The Working Group supports the recommendations made by the Joint Group. It further felt, that it is a very important improvement, to facilitate the quick claim settlement. This if implemented, would perhaps be a major benefit to farmers. Effectively, it would, make a scheme far more acceptable. It would require insurers to work out a fair and reasonable parameter to assess and release 50% of likely claims, using proxy indicators like weather, acreage damaged, satellite imagery, etc.

**(i) Individual assessment of losses in case of localized risks**

NAIS presently provides for individual assessment of losses in case of localized risks, viz. hailstorm, landslide and flooding, but only in one taluka of a state. Farmers feel the experiment is not adequate, and it should be implemented on a full scale, covering all areas.

Further, they also feel the losses on account of damage by wild animals, should be covered in the scheme and the losses be assessed on an individual basis.

The Working Group supports the view of Joint Group, that localized calamities should be assessed on an 'individual' basis in all the areas. However, with respect to damage by wild animals, it may be prudent to avoid this, as it is not considered an insurable loss. Alternatively, the losses assessed and paid through insurance, for damage by wild animals, may be made good by the government to the insurance company, instead of charging a premium for the risk.

**(j) Service to Non-Loanee farmers**

The awareness of the scheme is poor, partly due to lack of adequate localized servicing and substantially due to the lack of effective image building and awareness campaigns. For loanee farmers, with premia being deducted at the time of loan disbursement and claim settlements being credited to the farmer's loan account, the illiterate or poorly educated farmer, is hardly aware of the scheme's existence, let alone its benefits. The poor and adverse participation of non loanee farmers is even worse. Hence, major pilot studies, to build effective communication models, in this regard need to be conducted, as an integral aspect of policy planning.

NAIS being a multi-agency approach, the implementing agency presently has no presence, except in state capitals. The scheme is marketed to non-loanee farmers, through rural credit agencies. These farmers are not familiar and comfortable, going to distantly located credit agencies. Dedicated rural agents, who could provide service, supported by effective communication and training programs, would be a needed initiative.

The Working Group felt that a dedicated network of the implementing insurer agency, at the District / Tehsil level, was essential. Particularly, while servicing non loanee farmers. The need to complement service spread with effective awareness building campaigns, to ensure cost effectiveness and better penetration, even in non adverse years, was strongly perceived.

**(k) Premium Sharing by Financial Institutions (FIs):**

Crop Insurance claims are paid for adverse seasons, the loan availed of which in any case could not have been repaid by the farmer. The claim amount is automatically adjusted against the outstanding crop loan, leading to recovery of dues for FIs, and giving the farmer eligibility for fresh loan. In other words, Crop Insurance helps the flow of credit, to crop production.

Considering the overall benefits of Crop Insurance and its direct and indirect protection to lending activities, it is felt that the burden of high premium rates of Crop Insurance, may be partly shared by the FIs. Keeping in mind the collateral security provided by insurance, the Working Group recommends that 25% of farmers' premium subject to a maximum of 1.00 percentage points be borne by the FIs, in respect of loanee farmers.

**Box-3 in the following page gives current status of seed crop insurance and recommends revival for a meaningful seed crop insurance program**

### Box-3: Seed Crop Insurance

The Government introduced a Pilot Scheme on Seed Crop Insurance (PSSCI) during Rabi 1999-00 for 'Breeder', 'Foundation' & 'Certified' seeds in the following States and Crops:

Andhra Pradesh	Paddy, Maize, Jowar, Bajra, Sunflower, Cotton, Groundnut, Red gram, Castor & Jute.
Gujarat	Bajra, Wheat, Gram, Cotton, Groundnut, Maize, Red gram & Castor.
Haryana	Paddy, Wheat, Gram, Red gram & Cotton
Karnataka	Paddy, Maize, Jowar, Bajra, Ragi, Sunflower. Cotton, Groundnut, Red gram, Bengal gram, Black gram, and Green gram
Madhya Pradesh	Paddy, Wheat, Gram, Soyabean, Sunflower, Cotton, Red gram, & Mustard.
Maharashtra	Paddy, Jowar, Bajra, Wheat, Gram, Soyabean, Sunflower, Cotton Groundnut, Red gram, Green gram & Black gram.
Orissa	Paddy, Groundnut, Red gram & Cotton
Punjab	Paddy, Wheat, Gram, Red gram, Soyabean, & Cotton.
Rajasthan	Wheat, Gram, Soyabean, Groundnut, Red gram, Cotton, Bajra, Castor & Mustard.
Uttar Pradesh	Paddy, Wheat, Gram, Soyabean, Sunflower, Red gram, Cotton, Potato, Pea & Mustard.

The Scheme provided risk coverage at field level & certification level. The field stage cover had three sub covers, viz. (i) Failure of seed crop in the field either in full or in part due to natural and non preventable perils; (ii) Loss in Expected Raw Seed Yield due to prevalence of excessive rain, blowing of hot and/ or cold wind, excessive hot weather during flowering or seed setting stage; and (iii) Loss of Seed Crop in the field after harvest due to natural and non preventable perils. At certification stage, rejection of seed lots due to failure in 'Germination Test' due to operation of natural and non preventable perils during field stage.

Sum Insured is equivalent to preceding three/five year's average Seed Yield certified in respect of the identified unit area multiplied by 'Procurement Price' of the seed crop variety prevailing in the previous season by National Seed Corporation (NSC). Premium rates are actuarial and ranged from 2% to 5%. There was no subsidy in the premium.

The scheme continued for three seasons (till Rabi 2000-01 season) and was suspended due to lack of participation from seed growers. The season-wise coverage was as follows:

Season	Hectares covered	Sum Insured (Rs.)	Premium (Rs.)
Rabi 1999-00	1547.32	1,36,88,679	4,49,709
Kharif 2000	373.57	43,79,814	1,14,151
Rabi 2000-01	23.00	4,69,050	16,425
<b>Total</b>	<b>1943.89</b>	<b>1,85,37,493</b>	<b>5,80,285</b>

The main reasons perceived for poor acceptance of the scheme was:

1. Non-availability of premium subsidy
2. Insurance unit identified for arriving at average yield for working out sum insured was too big
3. Lack of cooperation from seed producers and lack of interest from States and State agencies
4. Poor awareness & publicity
5. Insurance demand for 'truthful' seed labels, which was not eligible for insurance coverage under the pilot scheme

Working Group feels seed is the key input in agricultural production and there is a strong demand for quality seed. The Group, therefore, felt a strong need for reviving the seed insurance scheme with appropriate modifications to provide support to the seed industry.

### **4.3. Coverage for Vegetables and Perennial Horticultural / Fruit crops**

The improvement of production and productivity, of fruits & vegetables is a priority area as the cultivated area under these crops is steadily increasing. These perennial horticultural crops are presently not covered by NAIS, and there is a strong demand for inclusion of these crops under the scheme.

Perennial horticultural / fruit crops have two economic components viz. the tree and the yield. The farmer needs insurance against losses in both, hence the yield based NAIS, cannot provide the required protection. For many of these, past yield data is not available for fixing premium rates and threshold yields. There are also problems like typical non-bearing periods, in the first 3-4 years, cyclical nature of production and different age groups of orchards within a unit, with varied productivity levels, etc. In view of the peculiarities and complexities involved in designing an insurance scheme for perennial horticultural crops and vegetables, the Joint Group recommended a separate pilot scheme for providing insurance cover, to perennial horticultural crops and vegetables.

The Working Group suggests an insurance approach based on - (i) 'individual approach' and (ii) weather insurance model, taking into account the peculiarities of perennial horticultural crops and plantation crops. Crops with clear weather influence could be brought under the purview of weather insurance (subject to availability historical weather data), and other crops, particularly high value crops with significant acreage density, could be covered under the individual approach. The Group learnt that AIC and a few other insurers, have already started both weather insurance and traditional insurance (based on individual approach), on a small scale. The Group, therefore, recommends the support of the government, to rapidly expand the pilots into full-fledged insurance products.

#### **4.4. Weather insurance:**

Many agrarian economies owe their strength to favorable weather parameters, such as rainfall, temperature, sunshine, etc. However, these economies are ill equipped, to deal with adverse weather incidences. Therefore, reducing vulnerability to weather in developing countries is a critical challenge, facing development in rain fed areas.

Sixty five percent of Indian agriculture is heavily dependent on rainfall, and, therefore, is extremely weather sensitive. Several studies including those by the National Commission on Water, have established that rainfall variations, account for more than 50% of variability in crop yields. Many agricultural inputs, such as soil, seeds, fertilizer, management practices, etc., contribute to productivity. However, weather, particularly rainfall, has overriding importance over all other factors. The reason is simple - without proper rainfall, the contributory value of all the other inputs diminishes substantially.

The basic idea of weather insurance, is to estimate the percentage deviation in crop output due to adverse changes in weather conditions. There are statistical techniques to work out the relationships between crop output and weather parameters. This gives the linkages between financial losses suffered by farmers, due to weather variations and also estimates the indemnities that will be payable. Analysis could also include, contingencies associated with the timing and the distribution of weather parameters, particularly rainfall, over the season.

##### **4.4.1. Advantages of Weather Insurance over traditional crop insurance:**

There are many shortcomings in traditional crop insurance. The important ones are: (a) moral hazards (b) adverse selection (c) multiple agencies and their huge administrative cost (d) lack of reliable methodology for estimating and reporting crop yields (e) delays in settlement of claims (f) program limited to growers (farmers). A majority of these limitations, are overcome through weather insurance.

A survey was conducted by ICRISAT in 2005 in the pilot areas of Mahabubnagar district of Andhra Pradesh, to understand from farmers, the reasons for buying weather insurance. The detailed responses are produced in Table-6 below:

**Table-6: Reasons for Buying Weather Index Insurance in India**

Reasons for buying insurance	Kharif 2004		Kharif 2005	
	Frequency	%	Frequency	%
Security /risk reduction	144	54.8	181	53.2
Could not afford to lose harvest income	25	9.5	11	3.2
Low premium	19	7.2	1	0.3
Advice from progressive farmers	18	6.8	0	n/a
Other, trusted farmers bought insurance	17	6.5	5	1.5
Advice from village officials	10	3.8	1	0.3
High payout	10	3.8	10	2.9
I grow a lot of castor	7	2.7	4	1.2
Product was well explained	5	1.9	0	n/a
I grow a lot of groundnut	4	1.5	0	n/a
Luck	4	1.5	5	1.5
Paid out for previous year	0	n/a	107	31.5
Advice from BUA members	0	n/a	11	3.2
Total	263	100	340	100

Source: ICRISAT survey

The categories listed were created from open-ended survey responses to the question, “Why did you buy the insurance product for the last kharif?” The same categories may not apply for both years.

#### 4.4.2. Summary of Pilots by Insurance Companies:

Till date, three companies have introduced pilot projects on rainfall insurance. The details of the products and concerns are discussed below:

##### (i). Agriculture Insurance Company of India Limited (AIC)

Agricultural Insurance Company of India (AIC) was incorporated on 20th December 2002, to protect and secure financial support, in the event of damage to crops. AIC introduced Rainfall insurance known as ‘**Varsha Bima**’ during the 2004 South-West Monsoon period. **Varsha Bima** provided five different options, suiting varied requirements of the farming community. These are – (i) seasonal rainfall insurance based on aggregate rainfall from June to September, (ii) sowing failure insurance, based on rainfall between 15<sup>th</sup> June and 15<sup>th</sup> August, (iii) rainfall distribution insurance, with weights assigned to different weeks between June and September, (iv) agronomic index, constructed on the basis of water requirement of crops at different pheno-phases and (v) catastrophe option, covering extremely adverse deviations of 50 percent & above in rainfall, during the season. Varsha Bima has been successfully piloted by AIC, in 20 rain gauge areas, across 125 IMD weather stations, spread over Andhra Pradesh, Karnataka, Rajasthan and Uttar Pradesh, in 2005.

In 2006, **Varsha Bima**, based on its success, was extended to 150 districts, covering 16 states across the country viz., Andhra Pradesh, Chhatisgarh, Gujarat, Karnataka, Maharashtra, Madhya Pradesh, Orissa, Tamil Nadu, Uttranchal, and Uttar Pradesh .Along with earlier options, the scheme also provided a Vegetative Phase option, covering the period from 16<sup>th</sup> August to 31<sup>st</sup> October. Varsha Bima-2005 covered 1.25 lakh farmers with a premium income of Rs. 3.17 crore against a sum insured of Rs. 55.86 crore.

AIC also implemented **Sookha Suraksha Kavach**, a unique rainfall insurance product, designed exclusively for drought stricken farmers of Rajasthan, providing drought risk insurance. The product was implemented in 23 districts, covering crops like Guar, Bajra, Maize, Jowar, Soyabean and Groundnut.

**Coffee insurance** was launched in the Hassan, Chikmagalur and Coorg districts, of Karnataka. The policy compensates the insured against the likelihood of diminished coffee output/ yield, resulting from shortfall in actual rainfall index, within a specific geographical location and specified time period and yield losses, due to other non preventable natural losses. Maximum sum insured per hectare for the Robusta and Arabica varieties, is Rs. 25,000 and Rs. 35,000 respectively, and insurance is available from 1<sup>st</sup> March to 30<sup>th</sup> June.

Agricultural Insurance Company of India, designed the **Wheat Insurance Policy** based on vigour and temperature. It has been launched in Haryana (Karnal, Rohtak, Ambala) and Punjab (Kapurthala, Ferozpur, Bhatinda). It is a unique technology based insurance product, which combines crop vigour / biomass as measured using satellite imagery, during the month of February, and weather (Temperature) parameters, during the 1<sup>st</sup> and/or 2<sup>nd</sup> fortnight of March. It provides effective risk cover to those wheat farmers who are likely to be impacted by poor growth of the crop(as measured in terms of Normalized Difference Vegetative Index-NDVI), arising out of non preventable natural factors/ incidences and loss in wheat production/ yield resulting from higher temperature. The maximum payout is Rs. 5,000/- each, under biomass cover and temperature cover. Premium rates are flexible, ranging from 3- 6 %, for various districts. Claims are automated and are settled on the basis of current

NDVI and Maximum temperature of the specified period. Insurance is available till 31<sup>st</sup> December of the year.

**Mango Insurance** has been designed by Agricultural Insurance Company of India (AIC) for a few districts of AP (Chittor, Krishna), Maharashtra (Ratnagiri, Sindhudurg, Raigad) and Uttar Pradesh. This unique product is unique, provides as many as 4 weather parameters (excess rainfall, wind speed, temperature below 16°C and frost), as triggers for deciding indemnity, for the first time in India. The premium chargeable depends on the coverage options ranges from 5-8 %.It operates during the months of December/January to May/ June. The insurance is available till 14<sup>th</sup> Jan. in AP and Maharashtra, and 31<sup>st</sup> Jan. in Uttar Pradesh.

**Concerns:**

1. The existing network of weather stations of the India Meteorological Department (IMD), is grossly inadequate.
2. There is a long delay of one to two months in receiving the weather from India Meteorological Department (IMD), even for the current season. In order to effectively use weather insurance as an important risk mitigation tool, the density of weather stations has to be increased while streamlining and automating the network.
3. Premium rates are high and largely unaffordable, to farmers. The government would need to support the product on the same lines as traditional crop insurance.
4. The product needs to be exempted from Service Tax, as it's primarily meant for resource poor farmers.

**(ii) ICICI Lombard General Insurance Company**

ICICI Lombard has been a pioneer, in bringing weather insurance solutions to the country's farming community. It was started in 2003 with a small pilot for 230 groundnut and castor farmers in Mahbubnagar (Andhra Pradesh). This year (2006), the product was offered to a larger geographical area and covered a wide range of crops. In the year, the company insured 1,29,440 farmers and 1,51,866 acres of cropped area of various crops and sum insured was Rs. 37.0 crores. The crops, parameters and states covered are, Soyabean -for deficit rainfall in Rajasthan and Madhya Pradesh. **Generic product for all field crops** - covering deficit rainfall during flowering and vegetative phases, excessive rainfall during maturity and

harvesting phases in Andhra Pradesh, Madhya Pradesh, Maharashtra, Jharkhand, Karnataka, Orissa, Rajasthan and Tamilnadu. **Grapes** - excessive rainfall during fruit bud differentiation, resting storage, fruit setting and ripening & maturity stages, deficit rainfall during resting storage stage, excessively high temperature and high variation in diurnal temperature during berry growth and harvesting stages in Maharashtra and Andhra Pradesh. **Paddy** - Prolonged dry spell during transplanting and vegetative growth phases, excessive rainfall during maturity and harvesting phases in Punjab. **Cumin** - High relative humidity for a continuous period of time during the vegetative growth phase. **Coriander**- covering frost like temperature conditions during sowing and vegetative phases, unseasonal rainfall during the crop maturity phase. **Fenugreek**-covering excessively high temperature during days with high relative humidity during the crop growth. **Kinnu** - covering excessively high temperature during the initial growth cycle, deficit rainfall during the flowering stage, high temperature during the maturity phase. **Oranges** - for deficit rainfall , prolonged dry spell during flowering, in Rajasthan. **Wheat** – for high temperature during the heading and flowering stages, unseasonal rainfall during the harvesting phase in Punjab, and Haryana. **Cotton** - for deficit rainfall during the seed germination phase in Maharashtra. **Premium**- in the absence of any support, premium rates have varied from 8% to 12%, depending on the crop and weather parameters covered. Claims experience has also varied depending on the degree of loss and deviation of weather parameters, with claims ratio going as high as 1800%, for some crops.

#### **Concerns:**

**High premium Rates:** Risk costs for weather insurance are higher, due to extreme variations in weather conditions, year on year. For example, in Rajasthan, every five years, the chances of drought are very high. Hence, insurance companies need to charge risk premium adequately, in order to cover their costs. In the process, if the cost of risk transfer by farmers to insurance companies (through weather insurance), becomes higher than the cost of risk-retention; the potential customers may not find weather insurance an attractive proposition. In order to bring down costs and subsequently for the future success of this product, Government needs to provide as much support, as it has been providing for Crop insurance.

Unlike crop insurance, weather insurance needs a reference weather station, which provides weather data to settle claims. Till a year ago, the India Meteorological Department (IMD) was the only agency recording weather data, which could be used to settle claims. Weather parameters such as Rainfall is spatially variable, hence, rainfall at a district level need not necessarily reflect the rainfall in all villages in that district. This is also known as Basis risk.

However, now National Collateral Management Services Ltd (NCMSL) has entered into installing automated weather stations at any Taluka level, which considerably reduces basis risk. NCMSL has installed 93 such stations spread across various states. for ICICI Lombard.

#### **(iv)IFFCO -Tokio General Insurance Company**

##### **Barish Bima Yojana** (Coverage and claims experience of weather insurance pilots)

The product was launched in Kharif 2004 in 9 districts of 4 states-Gujarat, Maharashtra, Andhra Pradesh and Karnataka on a pilot basis. Availability of rainfall data and rainfed regions were and are, the factors in identifying these districts. Considering the response in Kharif 2004, the Yojna was extended to 100 districts across 7 states for Kharif 2005. In Kharif 2006, another 25 districts were added, making a total of 125 districts in the following states - Gujarat, Maharashtra, Andhra Pradesh, Karnataka, Madhya Pradesh, Chhattisgarh, Tamil Nadu, Punjab, Haryana and Rajasthan. The Claims under this Policy are settled within 3 months of expiry of the policy. This Policy is not linked to the declaration or non-declaration of drought, by any official agency. The actual yield of crops is not measured, as the insurable event is rainfall deficiency, and not the actual shortfall in the crop yield.

Barish Bima Yojana is an index based Insurance product, which provides protection to farmers against deficiency in rainfall. The policy covers shortfall of rainfall based on the variation between the 'Total Weighted Actual Rainfall' (total of specified 4 months of Kharif season – June to Sep. or July to Oct.) and Total Weighted Normal Rainfall (total of specified 4 months of Kharif season – June to Sep. or July to Oct.), of a specified reference weather stations based on rainfall data provided by IMD/ centers recognized by IMD.

At present the policy is for the Kharif season, and covers practically every crop prevalent in the (Kharif) season. These include food grains like Paddy, Bajra, Jowar Maize, Pulses, Groundnut, Sesame, Soya bean, sunflower and other oilseeds.

### **Gehu Mausam Yojna**

ITGI introduced a unique Weather Insurance Policy for Wheat farmers, for the Rabi season of 2005-06. This Policy provides the wheat farmers a cover against potential loss in the yield of wheat, arising out of adverse temperatures during the Rabi season. The policy offers coverage in the form of Frost cover(Jan) and Heat Stress cover(March).

The areas covered for Genhu Muasam Yojna are Rajasthan (Kota, Chittorgarh, Sawaimadhapur, Tonk), M.P (Hoshangabad, Ujjain, Ratlam, Dewas, Indore) and U.P(Jaunpur, Varanasi, Allahabad, Rampur, Badaun, Shahjanpur, Bareilly). Based on data received, ITGI intimates through a suitable channel ( Newspaper, T.V etc.) about the happening or non-happening of a claim. The claim for each period is settled within 15 days of receipt of data from the IMD. The sum insured under this Policy, is flexible and depends upon the area under sowing. The minimum area for this Policy, is half an acre.

### **Concerns:**

**1. Weather Insurance - Voluntary in nature** - All members of Co-operative banks, are obliged to obtain Crop insurance, irrespective of their wishes. Loans for these member farmers, are disbursed through the Banks, which automatically deduct the premium amount from the sanctioned loan amount, as Crop insurance is mandatory. This burdens the already resource strapped farmer. Often the farmer is not even effectively aware, of the benefits. Even were he to understand the benefits of different weather policies, he is in no position to insure himself against the fury of nature. This defeats the very purpose of the scheme (compulsory Crop insurance), by limiting the insured to a specific and often immeasurable coverage and loss.

**2. Service Tax** – Weather insurance and weather policies are primarily designed for the farming community, who bear the maximum burden of nature. The financial health of Indian farmers at best, is an open secret. It is prudent to make this burden as light as possible. Exemption of Service tax could act as a breather in this reality.

**3. Lack of awareness and Infrastructure** –The benefits and facilities designed and offered are of no use, if the ones they are made for, are not aware of it. Similarly, basic infrastructure, like Weather stations with the latest accurate measuring technology, needs to go below the district level, to enable the benefit of the policy to reach the insured farmer.

#### **4.4.3. Automatic Weather Stations**

Existing weather stations in the country, provide inadequate information for the implementation of weather insurance. Recently, the Indian Space Research Organisation (ISRO), has developed a low cost Automatic Weather Station and transferred the technology to a commercial firm. The signals from the equipment will be transmitted to satellite and further received at the Space Application Centre, (SAC) Ahmedabad . From SAC, the data could be provided, by various states and agencies. Establishment of state level data centres, could also receive data and enable further utilization of the data base.

State government support is essential, for the installation of the equipment on a massive scale. Possible support from state governments, could include the following:

1. Identification of the site for the installation as per the specifications of IMD
2. Operation and maintenance of equipment
3. Partial financial support of the cost of the equipment, and
4. Establishment of data centres for receiving ISRO data for various purposes

The approval of IMD is essential., IMD could provide technical support in verification of these sites, before the installation of the equipment. The data could also be utilized by IMD, to strengthen the data base of IMD for other uses.

Since data transmission is through satellite, separate manpower is not needed for data collection. More over, the possibility of tampering of the data at a local level, is also not possible in this equipment. Some state governments, like Kerala, have already installed such equipment, with the technical collaboration of IMD. The expansion of the weather net work in the country, on a massive scale during the XI Five Year Plan, could be considered, as a collaborative project of state governments, ISRO and IMD.

Picture of Automatic Weather Stations (AWS) installed at Harni (Ratnagiri dt of Maharashtra) National Collateral Management Services Limited (NCMSL) is provided in Figure-3 below:

**Figure-3: Automatic Weather Stations (AWS)**



Automatic Weather Stations (AWS) installed by National Collateral Management Services Limited (NCMSL) Harni in Ratnagiri district (Maharashtra) for Agriculture Insurance Company of India Limited (AIC)

#### **4.4.4. Weather Insurance - Recommendations:**

Based on the review of the experience of the three insurance companies, the Working Group makes the following recommendations on weather insurance:

- (i) Weather insurance should be accorded priority, and, therefore, recommends strengthening and automation of the existing weather station network with at least one Automatic Weather Stations (AWS) in each Block / Circle of the country. In due course, the network has to extend to every Gram Panchayat. State governments should help installation of Automatic Weather Stations (AWS) by different agencies.
- (ii) Weather insurance be extended the same level of government support as 'Area Yield Insurance'.
- (iii) A 'Weather Insurance Pool' be created, to participate in the overall market's claim experience. Weather data sharing could be also practiced, to minimize costs.

- (iv) Government to support weather insurance on par with ‘area yield’ insurance, with a pilot to be launched for selected crops / territories.

#### **4.5. Farm Income Insurance Scheme (FIIS)**

NAIS protects the farmers only against yield fluctuations, while price fluctuations are outside the purview of the scheme. The farmer’s income however, is a function of yield and market prices. Therefore, despite normal production, farmers often fail to maintain their income level, due to fluctuations in market prices. To take care of the variability in income arising out of fluctuations in the yield and market price, the government introduced a pilot project, viz. Farm Income Insurance Scheme (FIIS), during the Rabi 2003-04 season. The objective of the scheme was not only to universalize MSP and to protect the income of the farmer, but also to reduce government expenditure on procurement of wheat and rice. The other objectives, were to encourage crop diversification and also to give a fillip to private trade. The scheme however was discontinued, just after the General Elections in 2004.

The Working Group considers that income insurance, is a comprehensive risk mitigation tool in agriculture. It strongly recommends revival of the ‘farm income insurance scheme, with some modifications as detailed below:-

- (i) Guaranteed income should be based on either ‘futures’ price from Commodity Markets, or should be derived from historical market prices. In case it is decided to use historical market prices, an appropriate correction factor be used, to compensate for inflationary trends.
- (ii) Farm income insurance could be tried initially for pulses and oilseeds, which are both price sensitive.
- (iii) A pilot could be launched with effect from the Kharif 2007 season, covering a few crops, from pulses and oilseeds, spread over 40- 50 districts in the country.
- (iv) The premium rates charged to the farmer, would be at par with those charged under ‘area yield’ insurance.

Box-4 in the following page provides insights into utility of insurance and hedging in managing farm risks

## **Box-4: Insurance & Hedging: Two Ingredients for a Risk Management Recipe**

### **Insurance & Hedging: Two Ingredients for a Risk Management Recipe**

Randy Schnepf, Richard Heifner, and Robert Dismukes, Agricultural Economic Services of USDA

**For a farm with high yield variability and a weak natural hedge**, crop yield or revenue insurance alone, provides substantial revenue risk reduction. Forward pricing combined with insurance - crop yield or revenue insurance, further reduces risk, although the gains are small, relative to the risk-reduction gains of insurance alone. Forward pricing alone, without crop yield or revenue insurance provides relatively little risk reduction, because price variability contributes less to revenue variability than does yield variability. Without crop yield or revenue insurance, the revenue risk stemming from yield variability, greatly reduces the effectiveness of forward pricing.

**When yields are relatively less variable**, crop yield insurance alone affords some risk reduction, but provides much greater risk reduction, when combined with forward pricing, particularly forward cash contracting. Since price variability predominates when yield variability is low, cash forward contracting, which eliminates both price-level and basis risk, is a very attractive option to a producer whose primary concern is minimizing risk.

**With low yield variability and a strong natural hedge**, forward pricing strategies are more effective, than either crop or revenue insurance. Under a strong natural hedge, low yields are generally associated with high prices, thus moderating overall revenue variability, even without insurance or forward pricing. Still, crop revenue insurance, when combined with forward pricing, can provide additional marginal risk reduction.

**When low yield variability coexists with a weak natural hedge**, forward pricing alone easily outperforms crop yield and revenue insurance in reducing risk, because price variability plays the dominant role in determining revenue variability, and because of the weaker relationship between the on-farm yield and the aggregate market price. Still, additional marginal gains in risk reduction can be obtained by combining crop revenue insurance with forward pricing.

## **4.6. Livestock Insurance**

### **4.6.1. Livestock Economy**

Livestock forms a significant proportion, of rural wealth and is an important source of rural livelihood in India. Almost all over the country, livestock-related economic activities are an indispensable adjunct of agricultural activity. In addition, livestock-related activities form the exclusive source of income for some groups of the rural community.

The livestock economy is large, with some segments being larger than those of conventional agriculture. The value of output from the livestock sector is Rs. 1,56,000 crores, which is about 20% of the value of output from agriculture. The value of output of milk is Rs. 1,10,000 crores, as compared to paddy which is Rs. 78,200 crores, or wheat at Rs. 48,450 crores. Besides this, India is a significant exporter of livestock products. Livestock, poultry and related products, earned Rs. 4,734 crores, while leather products earned Rs. 2,568 crores by way of exports in 2003-2004.

Apart from the absolute size of the livestock sector, it should be recognized that livestock related economic activities, have some unique features, in terms of income generation, for the agricultural community. For instance, livestock is often the source of continuous income for many, or at least one that generates income more frequently, than does regular agriculture. While conventional agricultural activity, produces seasonal incomes (typically twice a year in lump sums), it is left to the individual farmers to manage their cash flow uncertainties over the rest of the year. In contrast, livestock related activities may give a daily flow of income as in the case of dairies, poultry and fisheries. A weekly income in the case of bee-keeping sericulture, etc. and a fortnightly or monthly income, in goat and sheep rearing, is possible.

In other words, the livestock economy is itself a source of insurance for farmers in that it provides a diversified source of income and mitigates the uncertainties of seasonal income.

**Table-7: Supply and demand for livestock related products**

<b>Products</b>	<b>Supply</b>	<b>Growth Rate 2000-2020 Demand</b>	<b>Surplus 2020</b>
Milk	5 %	4.82 %	71.54 million tons
Mutton and Goat Meat	14.70 %	13.62 %	1.85 million tons
Beef and Buffalo Meat	4.70 %	3.40 %	6.64 million tons
Chicken	9.50 %	4.72 %	3.39 million tons
Eggs	8.10 %	6.12 %	6.12 billion eggs

Source: National Centre for Agricultural Economic Policy and Research -NCAEPR

It is evident that the growth rate of income from the live stock economy, is vastly greater, than that of regular agriculture. Over the next decade or so, the share of the live stock economy in agriculture, is expected to rise from the present level of 20%, to about 40% i.e. almost double. Please see Table-7 for growth projections for livestock products.

Livestock insurance density in India and Claim ratios are reported in the Tables 8 and 9 below:

**Table-8: Livestock Insurance Density**

<b>Year</b>	<b>Total Premium (Rs. crores)</b>	<b>Animals Covered (in crores)</b>	<b>Livestock Insurance Density (rupees)</b>
2001	144.68	0.89	162.56
2002	133.8	0.91	145.78
2003	120.45	0.63	191.04
2004	109.35	0.67	163.28
2005	137.68	0.79	174.28

**Table-9: Livestock Insurance – Claim Ratios**

<b>Year</b>	<b>Number of animals covered</b>	<b>Premium</b>	<b>Amount of Claims Paid</b>	<b>Incurred Loss Ratio</b>
	(in Crores)	(Rs. Crores)	(Rs. Crores)	(%)
1997-98	0.63	143.45	80.11	56
1998-99	0.79	152.02	126.08	83
1999-00	0.98	137.14	114.28	83
2000-01	0.89	144.68	135.93	90.20
2001-02	0.91	133.8	107.01	79.41
2002-03	0.63	120.45	110.51	92.45
2003-04	0.67	109.35	95.51	83.41
2004-05	0.79	137.68	89.36	66.24

There is one more reason to include livestock insurance in risk management in agriculture, viz.:

- a) India has three decades of experience with livestock insurance, so the physical and managerial infrastructure is in place.
- b) The Animal Husbandry Department, GOI, has been taking a keen interest in livestock insurance and has launched its own initiative, in the form of a national

livestock insurance scheme, whose pilot is under implementation in selected districts of India.

**Constraints on augmenting livestock insurance penetration:**

The claims ratios for livestock insurance stand on the brink of un-profitability – the average for the last 5 years is 82%. If we consider that 15% of premiums are paid as commissions, and management expenses are another 10% of premiums, with other administrative costs 10% more, then the ratio of claims to premiums would stand at about 120%.

The adverse claims ratio and hence, adverse probability is what is preventing the supply-side, from extending this branch of insurance vigorously.

There is a severe constraint from the demand side too, viz. the demand for livestock insurance, is extremely price elastic. Any attempt to increase the livestock insurance premium rate rapidly, brings down the number of animals insured, as well as the premium income. As illustrations, are two actual market experiments:

Mehsana District Co-operative Milk Union, Gujarat, was experiencing an adverse claims ratio of 180% during the period 1999-2001. To control the claims ratio, the premium rate was hiked up from 5% to 6% in 2001. The result was sharp decline in the number of animals covered from 39,000 to 14,000 and annual premium collection from Rs. 1.08 crores to Rs. 0.58 crores between 2001 and 2005.

The second example is that of the Sabarkantha District Co-operative Milk Union, which also had an adverse claims experience. The lead insurer, United India Insurance, decided to correct the premium rate and tighten the claims procedure in the year 2001. The number of animals insured dropped sharply from 25,000 to 15,000 and the annual premium collections from Rs. 1.10 crores to Rs. 0.65 crores between 2002 and 2005.

Both the case studies above, show how large is the price elasticity of demand, for livestock insurance. There is widespread withdrawal from insurance, with even a small increase, in the premium rate. The cause for such high price elasticity is obvious: it is low income.

Thus, simply raising the premium rate to make the livestock insurance operation viable may prove to be self-defeating.

Clearly, the solution lies in subsidizing the insurance operation to activate the supply side and take advantage of high price elasticity of demand, to increase coverage. Increasing coverage and penetration, to reduce the claims probability. Then, de-subsidising the premium rates gradually

Claims probability can be expected to improve, as the coverage increases. It is estimated, that at penetration levels beyond 25% or more, of the animal population, the claims probability (on account of death), will reduce to 2.5%. Genetic upgradation of the animal stock, will also reduce the claims probability on account of disease. Thus, over a period of time the premium rates can actually be brought down, so also the subsidy amount. It is expected, that due to genetic upgradation, the average value of animals, is expected, to increase at least 3 times by the year 2010. That also means that income derived from the improved breeds, will increase commensurately and bring down the price elasticity of demand, among other things. The time will then be appropriate, to begin desubsidising premium rates.

The livestock insurance scheme devised by the Department of Animal Husbandry, Dairying and Fisheries, has many salient features. The implementing agency would be the Department itself and the State Livestock Development Boards. The main functions would be to manage central funds, call quotations from insurance companies and payment of premium subsidy as well as payment to identified veterinary practitioners, in different districts. At present a pilot program is being implemented in 100 districts of the country.

The scheme selects insurance companies, on the basis of price quotes and service efficiency.

The scheme primarily covers the death of the animals. All additional coverage, such as 'Disability Risk', must be paid for by the beneficiaries. The premium rate is upwardly restricted to 4.5% for annual policy and 12%, for a 3-year policy. There is a premium subsidy of 50% and the sum insured, is the current market price as certified by a veterinary surgeon.

The scheme was begun under the 10<sup>th</sup> Five Year Plan and can be taken up in a full-fledged way under the 11<sup>th</sup> Five Year Plan, in the form of a National Livestock Insurance Scheme. At present, the livestock penetration is 6.58% of insurable cattle, which is very meager. The total subsidy element assuming 5% annual growth in penetration over the XI Five Year Plan to cover cattle and buffaloes is given in the Table below. The total cattle population is 28.3 crores.

The average premium per animal is Rs. 174.28. If penetration is increased by 5% per annum and a 50% subsidy is envisaged, the financial outlays over the XI<sup>th</sup> Five-year-plan penetration are presented in Table-10 below:

**Table-10: XI Plan Subsidy implications for the government**

<b>Year</b>	<b>Penetration</b>	<b>Subsidy</b>
<b>Present</b>	<b>6.58%</b>	<b>NIL</b>
<b>2007-08</b>	<b>11.5%</b>	<b>Rs.283 crores</b>
<b>2008-09</b>	<b>16.5%</b>	<b>Rs. 406 crores</b>
<b>2009-10</b>	<b>21.5%</b>	<b>Rs.529 crores</b>
<b>2010-11</b>	<b>26.5%</b>	<b>Rs. 652 crores</b>
<b>2011-12</b>	<b>31.5%</b>	<b>Rs. 775 crores</b>

As observed earlier, if the coverage and sum insured per animal increase, the process of de-subsidising premium can commence in about five years time.

Other issues like ‘moral hazard’ and ‘adverse selection’, which contribute to a high incurred claims ratio, can be addressed by using high tech tools like the RFID System (Radio Frequency Identification System), which is already in vogue successfully, in advanced countries. This will be all the more necessary, because the sum assured of an animal which stands at Rs. 2,500-Rs.3,000 currently, is expected to increase due to rapid replacement of existing stock, by genetically advanced varieties and stand nearly at Rs. 9,000 – Rs. 10,000 per animal.

The Working Group has the following recommendations:

- That the coverage of animals including cattle, goats and sheep be increased by 70 million in the course of the XI Plan, especially keeping in mind the huge numbers in this category, and the increasing costs of replacement.
- That subsidy be introduced at 50%, with an additional 5% of subsidy, being allocated towards the propagation of better health care services

## **4.7. Package Insurance**

### **4.7.1. Scope for Package Insurance**

Loss or damage to crops, is no doubt the major concern for the farmer. However, there are other assets of the farmer, such as livestock, agricultural implements, bullock carts, agricultural pump sets, stored grain, health, etc., whose loss is also an additional source of worry. Maintenance of these assets is vital, for good agricultural productivity.

Composite package insurance i.e. a single insurance policy, covering all assets of the farmer, including crops, is ideal for farmers, as such a policy / scheme could meet all insurance requirements of a farmer, under one contract. Reasonable premium rates and providing composite insurance cover for all his needs at his doorstep, would go a long way in ameliorating the situation, along with effective service, understanding and awareness.

Public sector general insurance companies are marketing the ‘**Kissan Package Policy**’, covering as many as 15 different items. The list of items insured policy is:

Section – I (a) Building & contents (Fire-allied perils and terrorism)

- Section – I (b) Contents (Burglary and Housebreaking)
- Section – II Farm produce & unprocessed grain
- Section – III Television set
- Section – IV Pedal cycle/cycle Rickshaw
- Section – V Personal Accident
- Section – VI Artisan’s, village, Cottage Industry, Biogas etc.
- Section – VII Cattle/Livestock
- Section – VIII Kissan Agricultural Pump set
- Section – IX Poultry/Duck Insurance
- Section – X Baggage
- Section – XI Animal Driven Cart
- Section – XII Honey bee
- Section – XIII Gun Insurance
- Section – XIV Mediclaim /Hospitalization
- Section – XV Agricultural Tractor

These policies are sold to individual farmers, and losses are assessed on an individual basis. Therefore, farmers who need package insurance, can buy the Kissan Package Policy available in the market. These policies prima facie mark a paradigm shift, in insurance thought. First, they recognize that the farmer’s needs are of a holistic nature, requiring protection against multiple risks and multiple impact of these risks. The second, they address the fact that the farmer is part of an interchangeable environment. Where the dependence of many other allied societal and deprived members of his community, are related to his success e.g. artisans – cobblers, potters, mechanics, etc, and small traders. Especially in adverse years, the farmer is compelled to even shift to one of these vocations, or alternatively accept the undignified option of being a labourer. Worse, move to the cities, or take some more serious action, under the burden of penury and debt ,like suicide. Thus, such policies mark a significant step forward, in addressing the farmer’s needs in a more complete manner.

#### **4.7.2. Package Insurance with Crop - Constraints**

It may look seemingly convenient to cover such varied assets / items along with crops under scheme like NAIS. However, there are practical difficulties, such as:

1. Crop Insurance is of seasonal nature (about 4-6 months), while all other items / assets listed under package insurance, need annual policies. Short period policies could be issued for items other than crops, but the premium rates would be high, and renewal would be cumbersome.
2. NAIS is based on an 'Area Approach', treating all insured farmers growing a particular crop as a single entity, while other items would not be pliable to such a broad approach, as such items owned by different farmers, would need different treatment.
3. Agriculture Risks are covariate (systemic) in nature. Thus, it is deemed that risks affecting all farmers in an area could be fairly dealt under the 'Area Approach'. The other risks affecting items other than crops are 'independent' in nature and hence, it will be difficult to connect loss / damage of other assets, to operation of covariate risks. In other words, the assets other than crops can be correctly indemnified in the event of loss only under 'individual assessment'.
4. Crops can be categorized broadly under a generic name, while it would be totally different in the case of other assets. For example, there would be different age groups of livestock, different sexes, breeds, etc. all attracting different premium rates etc.

The Working Group, therefore, feels that a composite policy covering all important assets of farmers cannot be combined with area based crop insurance program.

#### **4.7.3. Recommendations:**

A practicable insurance approach, would differentiate crops and other assets. Crops can be covered under area approach, while 'Other Assets' to be covered at individual farmer level. The Working Group is of the view that 'Area approach' based crop insurance, would continue to be stand-alone insurance. Only crop insurance, practiced based on 'individual approach' (corporate farming, high-value agriculture, etc.), could be integrated with insurance of 'Other Assets'.

As the Working Group also recognizes the advantages of addressing farmer's needs and simultaneously ensuring prudent risk management, it recommends, that a nodal insurer for the 'area based' crop insurance approach, especially the AIC, be allowed to exclusively tie up with other insurers ( for a period of 4-5 years), who offer package insurance for other assets, by providing a common vehicle for servicing, promotion and marketing.

With Micro Insurance Regulations in place, the scope to design tailor-made package insurance meeting almost all insurance requirements of the farmer has been widened.

#### **4.8. Private Sector Participation in Crop Insurance:**

##### **4.8.1. Scope**

The first license for the private sector, was issued in October 2000. As of today, there are ten private sector insurers in the general insurance business: Reliance, Tata-AIG, Royal Sundaram, IFFCO-Tokio, Bajaj-Allianze, ICICI-Lombard, HDFC – Chubb, Cholamandalam, ECGC and Star Health. The latter two, are limited to only a few lines of general insurance. The fact remains that these insurers have not yet undertaken agricultural insurance to a significant extent. Only two companies in the private sector have initiated crop insurance, albeit on a small scale. ICICI-Lombard was the first company to experiment with rainfall insurance in 2003. The concept is further extended to weather insurance since 2004. IFFCO-Tokio General Insurance (ITGI), the second company in private sector, started piloting rainfall insurance, since 2004.

The Insurance Regulatory and Development Authority (IRDA) has stipulated that every new insurer undertaking general insurance business, has to underwrite business in the rural sector to the extent of at least 2 per cent of the gross premium during the first financial year, which is to be increased to 5 per cent during the third financial year of its operation. Crop insurance is included in the rural sector insurance for this purpose. The business targets stipulated in rural insurance apparently are very small. Those who do not meet even these small targets, are getting away by paying penalties of nominal amounts. If private insurers are to be

spurred to enter the rural insurance market in a significant manner, the business targets have to be raised substantially by IRDA.

The experience of government supported and subsidized crop insurance and the recent entry of private insurers, raise questions about the co-existence of government and private agriculture insurance. One view is that the private sector will be unable to compete with government insurance, given the subsidies and access to the administrative machinery for delivering insurance. An alternative view is that given only 15 percent coverage by government insurance, the private sector can carve out a reasonable market for itself based on improved efficiency, better design and superior services. Here one can even think of public-private partnership in providing agriculture insurance as against public-private competition. However, it is possible only when crop insurance can be run in a more professional manner with clear objectives.

#### **4.8.2. Public – Private Participatory Models:**

Three different models of private partnership could be visualized: (1) First is Implementing Agency (IA) model, where IA bears no risk, earns no return and is merely reimbursed its administrative expenses. Such a model provides poor incentives for extending coverage and monitoring and controlling moral hazard and adverse selection. (2) Second is a model where the private insurer bears all the risk. Given the significant component of systemic risk in agriculture, such a model will require international reinsurance to be sustainable. The premium for such insurance is likely to be high, requiring subsidy from the government. Under this model, the government through a technical body works out commercial premium rates and offers up-front subsidy in premium to all insurers, who would be required to write policies. The farmer pays premium, less the subsidy. There is a level playing field for all insurers. Another modification in this model could be allocating territories to insurers who would be exclusively writing policies in specified territories. (3) Third is in between the two models discussed above with possibility of public-private sharing of risks. In this case, the government is likely to be at informational disadvantage, vis-à-vis the insurance companies which write the policies. Hence, the risk sharing agreement will have to be appropriately

designed to reduce problems of moral hazard and adverse selection. The agreement will also have to provide adequate measures to counteract the natural incentive of private insurers, to target larger farmers and pay less attention to small and marginal farmers.

**Agriculture Ministry's Initiative:**

Department of Agriculture & Cooperation (DAC), Ministry of Agriculture during 2004, invited general insurance companies, both public and private, requesting them to submit proposals on rural insurance, particularly agricultural insurance. A few companies submitted proposals and when asked to make a presentation, only two companies turned up with proposals for rainfall, farmer's package, and livestock insurance.

The Joint Group explored three alternatives of Private Sector Participation in Crop Insurance, which are briefly summarized below:

1. **AIC Rated Method:** The indicative premium rates worked out by AIC for the proposed scheme would be circulated to all private insurers, to enable individual insurers to quote premium rates for various crops and areas. Rates quoted by private insurers would be discussed with AIC, and the final lowest rate would be arrived for different crops and areas. Government can then allocate the areas and crops to insurers on the basis of the most competitive premium rate. Before allocating areas and crops to private insurers, the government should ensure that these insurers have adequate solvency and have signed a MoU, w.r.t. the terms of implementation of the program.
2. **Lowest Rate Method:** In the second alternative, the government would finalize and circulate the scheme to all insurers, for expression of interest in implementing the scheme and quoting premium rates. Insurers are required to quote premium rates for each crop, at state level. The government shall allocate the states & crops to insurers on the basis of lowest and competitive premium rate.
3. **Modified USA Model:** In USA, the government supported crop insurance program is implemented by about 15 private insurers, besides Federal Crop Insurance Corporation (FCIC), a government company. The program is administered by the Risk Management Agency (RMA), on behalf of the US Department of Agriculture (USDA). Once a crop insurance program is approved by the government, the RMA gets the premium rates

calculated for different crops / states / counties by utilizing the services of the National Crop Insurance Service (NCIS). Any approved insurer, can sell these insurance products, at the rates certified by the RMA. All insurers implementing the program, are eligible for the same level of premium subsidy, and the administrative and operating expenses of the insurer towards implementing crop insurance program, are entirely reimbursed by the government. Since the insurance companies are implementing the crop insurance program at a premium rate set by RMA, the government also provides a reasonable level of reinsurance support. The reinsurance support would be highest for developmental lines (new and unstable crops) and lowest for commercial lines (established and stable crops).

On the lines of USA model, the government through an exclusive technical agency, may get the premium rates worked out and offer the product to all insurers. Insurers can implement the product, enjoying the same level of support and subsidy. As a variation from the USA method, the government would not provide reinsurance support and reimbursement of administrative and operating expenses, as these costs would be loaded in the actuarial rates. The government can decide whether or not different insurers compete in the same area, or allocate specific crops and areas to a particular insurer.

The Joint Group recommended 'Modified USA Model', as the other two models, viz. 'AIC Rated Method' and 'Lowest Rate Method' are not workable, because the rating techniques and risk perceptions employed by each of the insurers, could be different. Further, except AIC, no other insurer has access to yield database of all crops and areas, the main component for rating. The Joint Group further recommended, the creation of an exclusive technical agency, or strengthening the Commission for Agricultural Costs & Prices (CACP), with actuarial experts to generate premium rates. To begin with, the private sector participation may be limited to certain crops/areas, leaving major crops / states, with AIC. With experience and maturity in the market, the entire program will be thrown open to all players.

‘Area Yield’ insurance, under the NAIS, or in its improved form, would still be based on a multiple-agency approach. Banks and State machinery, would have to continue their support in terms of delivery and yield estimation services, respectively. The multiple agency based approach, works fairly efficiently at present, because these agencies are dealing with a single insurance company, owned by the government. Problems would arise, if these agencies have to extend similar support to multiple insurance companies, both public and private.

The Working Group highlights two different models of Crop Insurance Partnership, practiced in Spain and USA in Box-5, below:

#### **Box-5 (a) : Insurance Model of Spain**

##### **Spain**

Spain has a unique model of crop insurance in terms of both the program and the organizational set-up. Spain has, what’s known as the ‘Combined Agricultural Insurance System’. The system started in 1980, has recently celebrated its Silver Jubilee. The basic feature of the system is that all insurable agricultural risks are covered by the private sector and all types of policies are subsidized by the state. Most policies are of the “multiple risks type. The customers of the system, are farmers who can take out agricultural insurance individually, or obtain coverage through co-operatives and professional organizations.

Participation in the system is voluntary. It is a system in which ‘AGROSEGURO’ operates, both in its own right and on behalf of the insurers, who make up the co-insurance pool. The system is based on an intricate partnership between the private and the public sector. The key players of the system besides farmers, are ENESA (Entidad Estatal de Seguros Agrarios), attached to the Ministry of Agriculture; AGROSEGURO (Agrupación Española de Entidades Aseguradoras de los Seguros Agrarios Combinados), a pool of forty private insurance companies which participate in a system of co-insurance; CCS (Consortio de Compensación de Seguros), a public enterprise with its own resources, operating as a re-insurer (under the control of the Ministry of Economy), etc.

A key feature of the Spanish system is the participatory approach. All stakeholders are represented in ENESA, which enables taking strategic decisions and fixing the framework for the System (annual plans) in line with their needs. For any given year, ENESA takes the lead in publishing the annual plan. On the basis of the framework set out in the plan, AGROSEGURO fixes the detailed conditions for all insurance products, in particular the regionally differentiated premium rates which vary according to risk exposure and also include administrative and re-insurance costs. Subsidies from the State and the Autonomous Regions are paid out by ENESA and channelled through AGROSEGURO to the insurance companies.

Based on experience from 1980 to 2005, of the total agricultural insurance income of 6.7845 Billion US\$, the contribution of farmers towards premium was 3.0755 Billion US\$ (45%) and that of ENESA and Autonomous Regions was 3.7089 Billion US\$ (55%).

## Box-5 (b): Insurance Model of USA

### USA

The Federal Crop Insurance Corporation (FCIC) was created in 1938, as a wholly owned government corporation. It is currently administered by the Risk Management Agency (RMA). The RMA was set-up in 1996, to administer the agricultural insurance programmes and other non insurance-related risk management and education programmes that help support US agriculture. The RMA regulates and promotes insurance programme coverage, sets standard terms – including premium rates – of insurance contracts, ensures contract compliance, and provides premium and operating subsidies.

Crop insurance policies are delivered – sold, serviced, and underwritten by private insurance companies, along with FCIC. Companies that qualify to deliver crop insurance, must annually submit plans of operation for approval by FCIC. The plan provides the FCIC, with information on the ability of the company to pay potential underwriting losses and on the allocation of the company's crop insurance business to the various risks sharing categories, for the purpose of re-insurance. In addition to re-insurance, the companies are paid a subsidy by FCIC for administrative, operating, and loss adjustment costs. The levels of administrative and operating subsidy and the terms of re-insurance, are specified in the Standard Reinsurance Agreement (SRA), which applies to all companies delivering FCIC-reinsured policies.

Private companies share the risk with FCIC by designating their crop insurance policies to risk sharing categories, called reinsurance funds. Companies retain or cede to FCIC portions of premium and associated liability. FCIC assumes all the underwriting risk on the ceded business and various shares of the underwriting risk on the retained business, determined by the particular category and level of losses. Companies can further reduce their underwriting risk on retained business, through private reinsurance markets.

#### 4. 8.4.Recommendations:

Working Group on the basis of the review made in the preceding paragraphs, recommends a Central Rating Method with Co-insurance Pool. The details are:

- The scope of insurance cover, terms & conditions would be set by the government, while AIC, would set the commercial premium rates.
- In order to minimize the issues of selective underwriting and not getting into the realm of support of the states in yield estimation and banks in product delivery, which might arise vis-à-vis private insurers, AIC will do the direct underwriting.
- The participation of private and other insurers, will be in the form of co-insurance sharing from a common pool. AIC to begin with, would retain 50% to its net account and the balance 50% would be up for co-insurance arrangements.

- AIC shall also negotiate reinsurance arrangement for the pool on behalf of all the participating insurers.
- The government may in future create an exclusive and independent technical agency with actuarial experts to generate premium rates (in place of AIC), similar to Risk Management Agency (RMA) on behalf of US Department of Agriculture (USDA).
- Direct participation of private insurers would be explored in the course of time and with experience.

The model recommended above, is only with respect to the government supported ‘Area Yield’ insurance. In respect of other insurance products, the insurance companies would be free to enter the market and underwrite business directly.

The Working Group further thought that given the freedom and choice many private insurers may not participate in large-scale crop insurance operations. In order to get every insurer to participate in crop insurance and thus increase crop insurance penetration in the country, a **‘Crop Insurance Pool’** should be created with obligatory participation depending on financial strength. An insurer can take facultative share of business over & above the obligatory level, subject to approved and agreed methods of allocation. The Program and the Pool can be managed by AIC, who would also participate to the extent of 50% of the program. Alternatively, an independent agency can be constituted to maintain the pool and seek reinsurance protection.

#### **4. 9. Financial Support to Crop Insurance**

##### **4.9.1. Penetration Targets**

As discussed in the previous chapters, the National Agricultural Insurance Scheme (NAIS) has certain shortcomings, leading to poor penetration. The scheme, which is compulsory for loanee farmers, could cover about only 1/3rd of the potential crop loans eligible for coverage. In all, the scheme could cover only about 15 % of farmers / cropped area in the country (refer to Table - 11). It is an irony, that the scheme with nearly 75 % subsidy, could hardly attract 1/7th of the farmers. If a crop insurance program, is to be accepted as an important tool in crop risk management, the level of penetration will have to be atleast 50 %.

In other words, the present level of acceptance of crop insurance will have to grow at least three-fold. This kind of penetration can only come with improvements in the scheme, which are suggested in the earlier chapters of this Report.

The State-wise comparison of farmers covered and acreage insured under NAIS (2005-06) with total farmers and acreage (1995-96) is presented in Table-11, to understand the level of penetration in various states.

The scheme during 2003-04 despite being largely comprehensive, could cover only 14.47 % of all cultivators and only 16.99 % of area (Table-11). Only Andhra Pradesh, Gujarat, Maharashtra, Orissa, Madhya Pradesh and Rajasthan, have decent levels of crop insurance protection, while other States lag far behind.

#### **4.9.2. Marketing Efforts:**

The non-loanee farmers for whom the scheme is voluntary, and who also constitute the majority, continue to show extremely low participation, often exhibiting extreme manifestation of adverse selection and moral hazard. Presently their participation in NAIS is barely 3%, which again is contributed only by a few states, viz. Karnataka, Maharashtra, Orissa and Jharkhand. Amongst the important reasons quoted for low participation, are the lack of awareness and understanding, and the effort required by the farmer to go to a bank to submit insurance proposal. Quite often, these farmers are turned away by Banks because of their pre-occupation with routine activities. Many a times they simply do not know of the proposal. Therefore, making available insurance at the doorstep of farmer / village through rural agents / micro insurance agents, with extensive awareness building programs, will be the key to improve the participation of non-loanee farmers.

The implementing agency, will have to immediately put in place a proper insurance delivery mechanism, such as rural agents, micro insurance agents, krishi bima sansthan, etc., blended with an active awareness communication drive, to reach out to non-loanee farmers.

**Table - 11**  
**Comparison of Total Farmers & Acreage cultivated and Farmers & Acreage covered under National Agriculture Insurance Scheme (2005-06)**

States/UTs	Total Farmers	Farmers covered under NAIS	NAIS covered farmers as % of total	Total Acreage (Hect)	Acreage under NAIS (Hect)	NAIS covered acreage as % of total
Andhra Pradesh	10603000	2247535	21.20%	14374000	3800567	26.44%
Arunachal Pradesh	104000	*	*	344000	*	*
Assam	2683000	22535	0.84%	3138000	16650	0.53%
Bihar	14155000	1235776	8.73%	10682000	928377	8.69%
Goa	70000	565	0.81%	59000	1425	2.42%
Gujarat	3781000	891075	23.57%	9904000	2546638	25.71%
Haryana	1728000	121400	7.03%	3676000	123168	3.35%
Himachal Pradesh	863000	9499	1.10%	1000000	7884	0.79%
Jammu & Kashmir	1336000	4501	0.34%	1013000	5563	0.55%
Karnataka	6221000	970767	15.60%	12109000	1678537	13.86%
Kerala	6299000	31776	0.50%	1712000	27665	1.62%
Madhya Pradesh	9603000	2842054	29.60%	21890000	7372430	33.68%
Maharashtra	10653000	2555027	23.98%	19880000	2124843	10.69%
Manipur	143000	*	*	174000	*	*
Meghalaya	160000	1969	1.23%	85000	1876	2.21%
Mizoram	66000	*	*	213000	*	*
Nagaland	149000	*	*	720000	*	*
Orissa	3966000	1130061	28.49%	5144000	1139635	22.15%
Punjab	1093000	*	*	4147000	*	*
Rajasthan	5364000	2336996	43.57%	21250000	5542829	26.08%
Sikkim	44000	237	0.54%	73000	69	0.09%
Tamil Nadu	8012000	119746	1.49%	7303000	211286	2.89%
Tripura	301000	2651	0.88%	181000	1772	0.98%
Uttar Pradesh	21529000	1292158	6.00%	18570000	1731060	9.32%
West Bengal	6547000	897391	13.71%	5588000	478435	8.56%
All UTs	107000	5039	4.71%	130000	6673	5.13%
<b>All India</b>	<b>115580000</b>	<b>16718758</b>	<b>14.47%</b>	<b>163359000</b>	<b>27747382</b>	<b>16.99%</b>

Note: Chhattisgarh, Jharkhand & Uttaranchal have been shown separately.

Assuming that there will be improvements in yield guarantee insurance, which will be patronized by a larger number of farmers; more farmer friendly weather insurance products; improvement in insurance delivery mechanism and participation of private insurers, the

Working Group proposes the penetration targets in terms of farmers / acreage covered under insurance for the XI-Five Plan Period in Table – 12 below:

**Table-12: XI Plan Insurance Penetration Targets**

<b>S.No</b>	<b>Year</b>	<b>Insurance Penetration (Cultivators)</b>	<b>Insurance Penetration (Acreage)</b>
1	2007-08	20% (24 millions)	38 million hectares
2	2008-09	25% (30 millions)	48 million hectares
3	2009-10	30% (36 millions)	58 million hectares
4	2010-11	35% (43 millions)	69 million hectares
5	2011-12	40% (50 millions)	80 million hectares

#### **4.9.3. Financing Mechanism**

The very nature of the agriculture sector, does not make it appropriate to view crop insurance viability merely from financial statistics viewpoint.. This is very relevant, as crop insurance schemes, both in developed and developing nations are greatly dependent on the support of the government. A developing nation like India, is not just dependent on weather conditions, but also suffers the brunt of natural disasters, as it is ill equipped to deal with such events. With nearly 2/3<sup>rd</sup> of the population dependent on agriculture, considerations, which have a direct bearing on the policy for agriculture development in India, include the effects of socio, economic and financial disruptions, as a result of agricultural risks. Further, agricultural risks are systemic in nature wherein a single event may lead to multiple losses. It is with such considerations, that crop insurance has been receiving governmental subsidies in most countries including developed countries where it has been successfully implemented.

It will be in order for crop insurance, to be regarded as a support measure in which the government plays an important role, because of the benefit it provides to the farmers, and to the entire national economy through forward and backward linkages.. Society can thus, significantly gain from more efficient sharing of crop and natural disaster risks. The principle behind the evaluation of crop insurance schemes all over the world is along these lines, and hence receives, the active support and finance of governments. To ensure that the burden on government is gradually reduced, increasing the number of participating farmers, through better marketing efforts, amongst others, is necessary. Integrating various risk mitigation

methods and streamlining funds, not only injects accountability and professionalism into the system, but also increases economic efficiency and viability.

#### 4.9.4. Subsidy levels in other countries:

The crop insurance support mechanism of some of major countries is given in Table-13:

**Table-13**  
**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)	<ul style="list-style-type: none"> <li>- Subsidy in premium (ranges from 38 percent to 67 percent; average for 2003 is 60 percent)</li> <li>- Reimbursement of administrative expenses of insurance companies (these were about 22 percent of total cost of the program during 2003-04)</li> <li>- Reinsurance support for risky crop lines</li> <li>- Technical services in premium, policy guidelines</li> <li>- free insurance of catastrophic cover for resource poor farmers</li> <li>- non insured assistance to farmers for crops no insurance is available</li> <li>- Creating awareness amongst farmers</li> </ul> <p style="text-align: center;"><b>Over all subsidy is about 70-75 percent</b></p>
2.	Canada	<ul style="list-style-type: none"> <li>- subsidy in premiums (80-100 percent for lower levels of coverage and 50-60 percent for higher levels of coverage)</li> <li>- significant contribution towards provincial administrative costs</li> <li>- provides deficit financing to provincial governments</li> <li>- technical services by setting premium rates</li> </ul> <p style="text-align: center;"><b>Over all subsidy is about 70 percent</b></p>
3.	Philippines	<ul style="list-style-type: none"> <li>- subsidy in premium (ranges from 50 percent -60 percent)</li> <li>- Banks share premium of loanee farmers (15-20 percent of total premium cost)</li> <li>- Financial support to Philippines Crop Insurance Corporation (PCIC) in extreme adversities</li> </ul> <p style="text-align: center;"><b>Over all subsidy is about 70 percent for loanee farmers &amp; about 50 percent for non-loanee farmers</b></p>
4.	Spain	<ul style="list-style-type: none"> <li>- Subsidy in premium (average 55 percent during 2005)</li> <li>- Reinsurance support (50 percent of reinsurance cost is paid by the government)</li> <li>- Technical guidance</li> </ul> <p style="text-align: center;"><b>Over all subsidy between 50-60 percent</b></p>

#### 4.9.5. Farmers capacity to pay premium:

In terms of the Agricultural Census 1995-96, marginal farmers having upto 1 hectare of land, comprised 61.6 % of the farm holding population, owning only 17.2 % of the area. Similarly, small farmers (1-2 hectares), comprise 18.7 % of the farm holding population, and own 18.8 % area. Only 19.7 % of farmers, have landholdings of more than 2 hectares. The average holding size of 'marginal farmers' is a lowly 0.40 hectares, and that of 'small farmers', is only 1.42 hectares. Table 14 below amply demonstrates the small landholding size, particularly of marginal and small farmers:

**Table-14: State-wise Average Size of Operational Holdings by Major Size-Groups, 1995-96 (Hectares)**

States/UTs	Marginal	Small	Semi-Medium	Medium	Large	All Holdings
Andhra Pradesh	0.46	1.43	2.68	5.74	15.34	1.36
Arunachal Pradesh	0.48	1.30	2.66	5.50	12.83	3.31
Assam	0.37	1.37	2.63	5.16	65.60	1.17
Bihar	0.34	1.32	2.73	5.57	16.52	0.75
Goa	0.35	1.38	3.00	8.00	-	0.84
Gujarat	0.54	1.47	2.80	5.90	14.79	2.62
Haryana	0.50	1.40	2.79	5.90	16.53	2.13
Himachal Pradesh	0.41	1.39	2.69	5.71	15.60	1.16
Jammu & Kashmir	0.39	1.38	2.66	5.39	-	0.76
Karnataka	0.48	1.45	2.74	5.87	15.03	1.95
Kerala	0.15	1.34	2.54	5.20	34.00	0.27
Madhya Pradesh	0.46	1.44	2.76	5.94	16.11	2.28
Maharashtra	0.49	1.45	2.73	5.76	16.20	1.87
Manipur	0.57	1.37	2.57	4.67	-	1.22
Meghalaya	0.49	1.25	2.41	4.50	-	1.33
Mizoram	0.61	1.38	2.33	-	-	1.29
Nagaland	0.56	1.10	2.60	5.95	14.71	4.83
Orissa	0.50	1.38	2.67	5.54	16.20	1.30
Punjab	0.60	1.31	2.60	5.73	14.98	3.79
Rajasthan	0.48	1.44	2.85	6.22	18.69	3.96
Sikkim	0.42	1.40	3.00	6.00	-	1.66
Tamil Nadu	0.37	1.39	2.70	5.68	23.62	0.91
Tripura	0.33	1.40	2.50	6.00	-	0.60
Uttar Pradesh	0.39	1.41	2.73	5.54	15.54	0.86
West Bengal	0.48	1.48	2.74	5.27	203.00	0.85
All India	0.40	1.42	2.73	5.84	17.21	1.41

Source: Agricultural Census Division, Ministry of Agriculture, New Delhi.

Given that the majority of farmers have very small landholdings, the success of crop insurance significantly depends on the scope and extent to which these farmers, who are poor, can be covered at affordable premium rates. Being characteristically impoverished, these poor farmers do not have access to the latest technologies and organized marketing.. Financial institutions have been making efforts, to reach this segment though with varied levels of success. The nature of the crop insurance business being highly dependent on the vagaries of climatic factors, the commercial premium rates would be very high and in most cases beyond the paying capacity of farmers.

Considering the above, the Joint Group recommended that the actuarial premium rates have to be adequately subsidized,, to make the scheme affordable to farmers. The various methods of providing subsidy discussed by Joint Group are summarized below:

1. **Rupee subsidy:** This is a very simple method, in which the subsidy is fixed in terms of rupees per hectare/ rupees per farmer. For example, it could be Rs. 250 and Rs. 500 per hectare for small / marginal and others, respectively. The subsidy could be further limited to specified number of hectares, say 5 hectares. Possibly, the rupee subsidy could be variable for different crops. It is a simple method and the government on the basis of insured acreage, can easily estimate its financial liabilities. However, extreme premium rates in the Indian context, may render the method ineffectual.
2. **Percent basis:** This is yet another simple method, wherein the premium rates are subsidized in terms of particular percentage of actuarial premium. The percentage could be different for various categories of farmers. For example, it could be 75% subsidy for small / marginal farmers and 50% for other farmers. The disadvantage of this method, provides subsidy at the same rate irrespective of whether or not the actuarial premium rates are high or low. For example, the actuarial premium rate is 2% (wheat), and affordable to the farmer. Yet, as per the subsidy formula, small / marginal farmers would be required to pay only 0.5 % and other farmers, only 1%.. On the other extreme, if the actuarial rate is 30 %t (groundnut), despite subsidy, the small / marginal farmer is

required to pay 7.5% and other farmers 15% premium, which is still beyond the farmer's means.

3. **Premium Capping:** This is a method, wherein actuarial rates are capped for farmers, and the rate beyond the cap is subsidized. The rates are capped in such a way that the net rates are affordable to farmers. The indicative capping for proposed crop insurance program is given below in Table-15:

**Table-15: Premium Subsidy – Farmer Capping Model**

S.No	Crop Groups	Premium cap for Small / Marginal farmers		Premium cap for Other farmers	
		Kharif	Rabi	Kharif	Rabi
1	Rice and Wheat	3%	1.5%	5%	2.5%
2	Other Cereals & Millets	4%	3%	6%	5%
3	Pulses	4%	2%	6%	4%
4	Oilseeds	4%	2%	6%	4%
5	Sugarcane	1%	1%	2%	2%
6	Annual commercial / horticultural crops	4%	4%	6%	6%

The disadvantage of this method is that the risk is not adequately discriminated. Irrespective of differences in rates across states, farmers will pay the same rate. Rice actuarial premium rate during Kharif is 6.5% in Orissa and 9.4% in Gujarat. However, in both the cases, the 'other category' farmer, would be required to pay 5%. Similarly groundnut actuarial premium in Gujarat is about 35%, and 5% in Maharashtra. As per the model suggested above, the Maharashtra farmer pays full groundnut premium (as the premium rate is within the cap) and Gujarat farmer, only 6 %, leaving the balance 29 %, to be borne by the government.

4. **Graded Percent basis:** This is a method, evolved by fine-tuning the 'percent method', and takes care of extreme variations in actuarial premium rates. In other words, the subsidy rate is lower for lower premium rates, gradually increasing the subsidy rate with increases in the premium rate. It combines the advantages, of both the 'percent method' and 'premium capping method'. The effectiveness of the method can be further improved, by fixing minimum and maximum premium rates for farmers.

#### 4.9.6. Recommendations:

After considering the huge differences in actuarial premium rates across crops and states, and considering the pros and cons of various methods discussed above, the Working Group recommends the 'graded percent method'. The indicative subsidy levels recommended by the Working Group are given in Table-16 below:

**Table-16: Premium Subsidy Model for XI Plan period**

S. No	Premium slab	Subsidy to farmers
1	Upto 2%	No Subsidy
2	>2 – 5%	25% subject to minimum net premium of 2.00%
3	>5 – 8%	40% subject to minimum net premium of 3.75%
4	>8 – 12%	50% subject to minimum net premium of 4.80%
5	>12% -20%	60% subject to minimum net premium of 6.00%

#### 4.9.7. Government's support

The government's support in an actuarial regime would be in terms of premium subsidy, leaving all claims to the insurers. The average actuarial premium rate in the country with proposed improvements would be in the range of 15 -18% of sum insured. Considering that premium for farmers is capped between 2% - 8%, the balance of premium will have to come from the government. The sharing between centre and states can be decided keeping in mind the premium rates and the financial outlay. However, with reference to catastrophic claims for 'developmental lines', the government would be required to pay claims exceeding 200% of risk premium.

#### 4.9.8. Financial Outlay for the Government

As per the risk sharing arrangement of NAIS, claims beyond 100%, premium in case of food crops and oil seeds, and 150%, premium for annual commercial and horticultural crops, are borne by the government (50:50 basis between the Government of India and States). Besides, the premium subsidy payable for small / marginal farmers is also borne by the government. On the basis of the coverage and the claims experience of the past 4 years, the government annually spends Rs. 1,000 crores on NAIS for covering about 1.2 crore farmers.

The proposed improvements in NAIS, are expected to significantly increase the financial implications of the government. Indicative financial implications for the government for various improvements are given in Table-17.

**Table – 17**  
**The broad government’s financial implications of modified NAIS**

<b>S.No</b>	<b>Improved Features</b>	<b>Likely liability</b>
1	Government’s revised liability for 1.8 crore farmers	Rs. 1,050 crores
2	Government’s liability of actuarial regime with insurance unit reduced to Village Panchayat for major crops (on an average 30% increase in claims pay-out)	Rs. 1,365 crores
3	Above (2) + Average yield calculated by taking long term average of 10 years (on an average 15% increase in claims pay-out)	Rs. 1,570 crores
4	Above (3) + Indemnity Limit of 90%, 80% & 70% in place of 90%, 80% & 60% (on an average 8% increase in claims pay-out)	Rs. 1,700 crores
5	Above (4) + Coverage of prevented sowing risk (on an average 5% increase in claims pay-out)	Rs.1,785 crores
6	Above (5) + Coverage of post harvest losses on account specified perils (on an average 2% increase in pay-out)	Rs. 1,820 crores
7	Above (6) + on account payment based on rainfall parameter. Theoretically, no increase is expected in pay-out	Rs. 1,820 crores
8	Above (7) + Individual assessment in case of localised calamities (on an average 0.5% increase in pay-out)	Rs. 1,830 crores
9	Above (8) + cover of fruit crops and vegetables under separate scheme (estimated liability of Rs. 100 crores)	Rs. 1,930 crores
10	Above (9) + Weather Insurance Pilot (estimated liability of Rs. 50 crores)	Rs. 1,980 crores
11	Above (10) + Farm Income Insurance Pilot (estimated liability of Rs. 100 crores)	Rs. 2,080 crores
12	Above (11) + Administrative liability of Rs. 165 crores towards cost of additional CCEs.	Rs. 2,245 crores
13	The financial liabilities w.r.t. financing the ‘catastrophic’ claims for ‘risky lines’ at Rs. 200 crores in the 1 <sup>st</sup> Year	Rs. 2445 crores
14	Above (12) + subsidy for livestock insurance (Rs. 283 crores in the first year)	Rs. 2,728 crores

***Notes governing the financial implications for the government::***

**Originally the government's annual liability on NAIS is Rs. 1,400 crores at 15% penetration.** Considering the increase in proposed premium rates payable by the farmer in the new scheme, the reduction in government's liability is estimated at 25% i.e., Rs. 350 crores on Rs 1,400 crores. The revised liabilities, therefore, are taken at Rs. 1,050 crores as the base.

***Lowering insurance unit to village panchayat level:*** A sample exercise was conducted a few years ago under CCIS, which broadly indicated an increase of about 35% for every one level of reduction, i.e. from block / taluka to village panchayat. Therefore, overall increase in liabilities for major crops is estimated at 30%, resulting from lowering the Insurance Unit (IU) to the village panchayat.

***Threshold Yield to be based on long term average:*** A random exercise in Andhra Pradesh & Orissa on Kharif seasons for paddy under NAIS, have shown an increase in claims by approximately 20%, if the best five years, are adopted from out of preceding seven years. Considering that the threshold yield would now be based on long term average of 10 years (with de-trending), increase in the liabilities is estimated at 15%.

***Minimum indemnity limit of 70%:*** As a result of this, all areas presently eligible for 60% limit, will now be eligible for 70%. Presently there are 58% areas, during Kharif, eligible for 60% limit. Raising the level to 70%, has two implications – (i) increase in frequency of claims, and (ii) increase in quantum of claims. It is estimated that the financial liability will be increased by 8%.

***Prevented sowing / planting:*** Implications are mainly in the Kharif season, due to its overwhelming dependence on the southwest monsoon. Sowing operations are affected, if the actual rainfall during June and July is below a certain point. This problem was faced during Kharif 2002 and to some extent during the Kharif 2004 season. This problem is not encountered during a normal monsoon, particularly in the early months. It is estimated that the increase in financial liabilities could be to the extent of 5%.

***Post harvest losses:*** It is intended to cover only the crop in 'cut & spread' condition lying in the field after harvest, against damage due to cyclones. The main crop benefited will be paddy, in the east coast. The financial liabilities may increase by a nominal 2%.

**Individual assessment in case of localized calamities:** The cover available is against hailstorm, landslide & wild animals. Hailstorm is mainly seen during Rabi seasons, especially in the north. Landslide is an issue only in hilly regions. Wild animals cause damage, mostly in areas close to forests. Considering this, a nominal 0.5% increase in financial liabilities is estimated.

**The financial liabilities w.r.t. financing the ‘catastrophic’ claims** for ‘risky lines’ has been estimated at Rs. 200 crores, Rs.250 crores, Rs. 300 crores, Rs. 350 crores and Rs. 400 crores for the 1st, 2nd, 3rd, 4th and 5th years of the Plan Period.

**The financial liabilities for covering fruits and vegetables** crops can be accurately worked out only after finalizing the scheme design and crops to be covered. Tentatively, a subsidy of Rs. 100 crores, has been included in the financial liabilities.

**The financial liabilities for weather insurance pilot** have been estimated at Rs.50 crores. Scaling up the pilot may mean commensurate reduction of liabilities, under ‘Area Yield’ insurance and hence, may not require additional provision of funds.

**The financial liabilities for running a pilot on Farm Income Insurance** for select crops has been estimated at Rs. 100 crores. Scaling up the pilot may mean commensurate reduction in liabilities under ‘Area Yield’ insurance and hence, may not require additional provision of funds.

**Administrative cost of CCEs:** The additional CCEs required could be to the tune of 55 lakhs @ 8 CCEs per Crop per GP (maximum of 3 crops). The administrative cost @ Rs. 300 per CCE will be Rs. 165 crores.

**Subsidy for Livestock insurance::** Expanded penetration of livestock insurance from the currently level of 6.58% of insurable cattle, by covering 5 % more of insurable cattle, sheep and goats annually, with 50% subsidy, would involve additional outlays of Rs.283/ 406/ 529/ 652 / 775 crores, by the government during the XI Plan period

Assuming that the financial implication of the government is Rs. 2,728 crores per annum at 15% penetration (1.8 crore farmers), these financial implications have been extrapolated for different levels of penetration, assuming 10% annual escalation in sum insured. The details are given in Table-18, below:

**Table-18: XI Plan Period Financial Implications for the Government**

<b>S.No</b>	<b>Year</b>	<b>Insurance Penetration (Cultivators)</b>	<b>Governments' Liability</b>
1	2007-08	20% (24 millions)	<b>Rs. 3833 crores</b>
2	2008-09	25% (30 millions)	<b>Rs. 4741 crores</b>
3	2009-10	30% (36 millions)	<b>Rs. 5629 crores</b>
4	2010-11	35% (43 millions)	<b>Rs. 6507 crores</b>
5	2011-12	40% (50 millions)	<b>Rs. 7365 crores</b>
<b>Total for XI - Five Year Plan</b>			<b>Rs. 28075 crores</b>
<b>Total Liability of the Government of India (assuming 50:50 sharing with States)</b>			<b>Rs. 14038 crores</b>

**Note:**

- (1) Higher levels of participation are expected to achieve a good spread of risk. Therefore, liabilities as a proportion would be lower at higher levels of participation.
- (2) Administrative expenditure on CCEs (Rs. 165 crores) is consistent, irrespective of the level of penetration

## **5. Crop Insurance Support Services**

### **5.1 Using Satellite Imagery in Crop Insurance**

Remote Sensing Technology (RST) is the emerging technology, which has the potential to offer plenty of complimentary and value added aids for crop insurance. It not only provides insurers with tools like hazard mapping, crop health reports, acreage-sown confirmation, yield modeling, etc., that importantly verify claims, but also strengthens the position of insurers, vis-à-vis the re-insurance market.

The technology is already being tried out in agriculture insurance, in countries like the United States of America (USA), Canada, Australia, etc., for locating damaged areas and estimating the extent of damage.

The Agriculture Insurance Company of India Limited (AIC), realizing the potential of RST has conducted a few pilots between 2003 and 2005. These pilots were with reference to. (i) estimating cropped acreage under different crops; (ii) stress detection and crop health reporting; and (iii) generating yield estimates at insurance unit level for insured crops.

The pilot did reveal some inadequacies in the implementation of this technology, like difficulty in getting cloud-free images (particularly during the Kharif season), unsuitability for crops with lower foliage / biomass, high-resolution data being expensive, etc. Still, RST in the coming days, is likely to play a very important role in crop insurance.

RST lends greater credibility to an insurer's efforts towards securing re-insurance, since these technologies are being used in developed countries. Unbiased, objective and independent data, enables the insurer to crosscheck and supplement other field information inputs. Independent information sources, will help check inflated claims. Periodic independent ground investigations based on satellite and Geographic Information System (GIS), will further limit such claims. Remote sensing data on crop area and relative productivity levels, will be available well before the cut-off date for receipt of crop yield data provided by the Directorate of Economics and Statistics (DES), facilitating adequate ground validation. In-season monitoring will assist monitoring of crop progress, and provide

advance warning of expected claims after the season. Similarly, the geo-referenced GIS database, would provide the basis for reliable analysis and risk mapping zones.

**Potential Applications:**

- (i) Estimating actual acreage-sown at the insurance unit level to check the discrepancy of 'over-insurance' (acreage insured higher than acreage sown).
- (ii) Investigating anomalies / discrepancies in acreage-sown, through ground surveys using the Global Positioning Systems (GPS).
- (iii) Monitoring crop health through the crop season, and investigation on ground for advance intimation of yield losses.
- (iv) Investigating satellite derived crop areas and those from crop cutting experiments, to check adequacy and reliability of data.
- (v) Developing satellite based crop productivity models for cereals and other crops.
- (vi) Developing a Geographic Information System (GIS) of defined area of insurance unit for user-friendly viewing, querying and analysis of the agricultural situation.
- (vii) Use of RST applications, as a trigger to facilitate early claim settlements.
- (viii) GIS for office operations of crop insurance.

The Group is of the view, that these are some of the useful applications of remote sensing technology, in crop insurance. Remote sensing technology applications, could also be of use in finalizing 'on-account' settlement of crop insurance claims, within the season. Finally, RST alone can make the switch over from an area approach, to farm level yield estimation. This should be possible, in the not too distant future in India.

The Working Group recommends that a pilot project on using remote sensing technology in crop insurance, should be undertaken up by AIC from the Kharif 2007 season onwards. The areas for the pilot project may include:

- (a) Acreage estimation
- (b) Crop health reports
- (c) Yield modeling
- (d) Reduction of sample size of CCEs
- (e) Remote Sensing data as proxy indicators, for finalizing quantum of 'on-account' indemnity, under the National Agricultural Insurance Scheme (NAIS)

## 5.2. Crop Insurance Marketing & Distribution

### 5.2.1. Traditional Insurance Marketing

Insurance by nature is mistakenly believed to be sold, not bought. Currently, it is partially true. Crop insurance aims at farmers who are mostly resource-poor, with limited access to information, making typical marketing difficult. Hence, very substantial awareness and dissemination programs are essential. Particularly, as an urgent intermediary step to create a climate which would facilitate the effectiveness of direct selling personnel, cost effectively.

Traditionally insurance is sold and serviced through insurance intermediaries consisting of insurance agents and insurance brokers. Insurance agents could be both 'individual' and 'corporate', but can work for only one life insurer or one non-life insurer, or both (composite agent). Agents represent the insurance company. Brokers are rather new to the Indian insurance industry, and came in only after reforms in the insurance sector. Brokers represent the insured party and can take the business to any insurer, who offers the best insurance terms. Unlike agents, brokers could also participate in risk inspection, rate negotiation and claim processing procedures, etc. Bank assurance is a new concept, again started after the insurance sector has opened up. Under this concept, a Bank or Financial Institution takes the corporate agency of an insurance company, and starts selling the insurance products to its banking clients in particular and the general public

Area Yield Insurance, viz. National Agricultural Insurance Scheme (NAIS), is credit linked, and hence, the product is rightly serviced through Financial Institutions (FIs). The product is compulsory for borrowing farmers, and the FIs extend insurance as and when a crop loan is disbursed. Non-borrowing farmers, for whom the scheme is optional, can avail insurance from the nearest branch of the FIs, by paying the requisite premium. This concept has been conceived as cost effective insurance marketing, with reasonable control over asymmetric information, particularly in case of borrowing farmers. This model, however, **has not been successful in servicing non-borrowing farmers, who largely outnumber borrowing farmers**. As discussed earlier, the prime reason is lack of benefit awareness amongst this segment, servicing shortfalls and moral hazards.

### **5.2.2. Micro-Insurance Regulations, 2005:**

The IRDA has notified Micro-Insurance Regulations, 2005, to help insurers to adjust their costs of serving marginal clients in remote areas, by collecting premiums and installments, and offering services at the door step . These Regulations, permits an insurer carrying on life insurance business, to offer life micro-insurance products as also general micro-insurance products, to poor households. Similarly, an insurer carrying on general insurance business may also offer life micro-insurance products. The salient features of the Regulations are discussed below:

**(i) Tie-up between life insurer and non-life insurer:** The Micro Insurance Regulations, provide a framework under which customers can avail both kinds of policy, from a single insurer. Under the Regulations, an insurer carrying on life insurance business can offer any general micro-insurance product, but shall have to tie-up with an insurer carrying on general insurance business and pass on the premium attributable to the general micro insurance product, either directly or through any of the distributing entities, of micro-insurance products, to the general insurance insurer. In the event of any claim in regard to general micro-insurance products, the insurer carrying on life insurance business or the distributing entities of micro-insurance products, shall forward the claim to the insurer carrying on the general insurance business, and assist in the expeditious disposal of the claim. Similarly, an insurer carrying on general insurance business, could offer any life micro-insurance products, by entering into tie up with the Life Insurance companies.

**(ii) Appointment of Micro Insurance Agents:** The Regulations provide for the appointment of micro insurance agents, for distribution of micro insurance products. For this purpose, the term “micro-insurance agent” would means.- (i) a Non-Government Organization (NGO); or (ii) a Self Help Group (SHG); or (iii) a Micro-Finance Institution (MFI), who is appointed by an insurer to act as a micro-insurance agent for distribution of micro-insurance products. Micro-insurance agents shall not work for more than one insurer, carrying out life/ general insurance business.

**(iii) General / Non-Life Micro Insurance Products:** The details of micro insurance products as per (IRDA) Regulations, are produced in Table-19, below:

**Table-19: Details of Micro Insurance Products**

Type of Cover	Minimum Amount of Cover	Maximum Amount of Cover	Term of Cover (Min)	Term of Cover (Max)	Min. Age at entry	Max. age at entry
Dwelling & contents, or livestock or Tools or implements or other named asset / or Crop insurance against all perils	Rs. 5,000 Per asset/cover	Rs. 30,000 Per asset/cover	1 year	1 year	NA	NA
Health Insurance Contract (Ind.)	Rs. 5,000	Rs. 30,000	1 year	1 year	Insurer's discretion	
Health Insurance Contract (family) (Option to avail limit for Individual/ float on family)	Rs. 10,000	Rs. 30,000	1 year	1 year	Insurer's discretion	
Personal Accident (per life/earning member of family)	Rs. 10,000	Rs. 50,000	1 year	1 year	5	70

Micro insurance regulations, as can be seen from the table, also include insurance of crops against all perils, and, therefore, it's a golden opportunity for insurers to strengthen their marketing network and expand their reach. Relevant promotional efforts will go a long way in facilitating this. As the regulations also permit combining various insurance covers, including life insurance cover, it provides an excellent opportunity for insurers, to bundle insurance products as package insurance.

### **5.2.3. Scope for Innovative Marketing & Distribution Channels**

The Micro Insurance Regulations - 2005 would facilitate convenient and flexible insurance products and their distribution. The Working Group has examined the distribution issues, and recommends the following approaches, in addition to the existing distribution channels:

#### **(a) Post Offices:**

The country has a network of nearly 1,40,000 post offices in the rural areas, whose activities have been also now extended to crop loan lending. The local postman is very handy and well known in the village, and can be a great source for crop insurance marketing and servicing.

The Group learnt, Agriculture Insurance Company of India Limited (AIC), is already working on the modalities with India Posts.

**(b) Deploying existing network of Agents of General & Life Insurers**

Crop insurance marketing and distribution by nature is a seasonal activity, and hence, may not interest the potential insurance agents to seek the agency, of an exclusive agriculture insurance insurer like AIC, as the activity cannot provide round the year engagement and livelihood. In this context, it would be worthwhile to explore the possibility of allowing existing agents of other insurance companies to distribute and service crop insurance products of AIC, so long as there is no product conflict. To begin with, public sector general insurers, who have a vast network of rural agents, may be enlisted for crop insurance distribution. The IRDA may look into this aspect, and facilitate necessary flexibility.

**(c) Using a network of Agri-Input Suppliers**

The country has a huge network of agricultural input suppliers, who work closely with the farming community, and, these therefore, should be encouraged to distribute crop insurance products. Similarly Agri Commodity Traders, can also distribute crop insurance products.

**(d) Building Awareness**

To make the cost effective growth of insurance products, in the rural economy, considering all the challenges detailed earlier, and the reluctance of private insurers and distribution mechanisms, to expand the base of insured farmers, it is essential to initiate large scale awareness building campaigns through the AIC.

**5.2.4. Krishi Bima Sansthans**

At present the implementing agency for crop insurance (AIC) doesn't have office network below the state headquarters. The Group is strongly in favor of creating a district level set-up in order to coordinate the crop insurance activities with banks, district agencies and to facilitate crop insurance marketing and delivery. The set up could also be involved in insurance education and awareness. However, to minimize the administrative costs in the initial stages, the set up could be out-sourced with competent people.

### **5.3. Need for a Nationally Consistent Database**

The Government of India has been collecting, collating and publishing data periodically on various aspects of the economy. Government, researchers and others use these databases to understand the past and current situation and also prepare plans for the future. As we move to more a interdependent and globalized world, the quality of data bases become an important determinant in responding to the challenges. For example, crop insurance is becoming increasingly important, in helping to manage risk at farm levels. To implement insurance schemes, we need accurate data on crop yields and acreage at the individual and aggregated levels, to decide actuarial premium and timely data to decide the indemnity payments. Today, agricultural insurance is suffering due to lack of both accurate data as well as timely availability. It takes 3 - 5 months to get CCE data from the time of harvest of crops. Such long delays make insurance payment meaningless, for farmers who have suffered huge losses and have no other means to fall back on. In the current context of extreme distress in agriculture, a good insurance plan which can make immediate payment to farmers, can help alleviate distress. Since, we do not have a proper system of collecting, compiling and publishing data within reasonable amounts of time, farmers suffer, and insurance as an avenue for mitigating distress is ineffective.

Therefore planning and implementation of vital policies and programmes are severely handicapped by the inadequate data generating / publishing processes. Despite current technological advancements in data capture, storage and data transmission, Government machinery does not seem to have paid adequate attention to use the currently available technology to evolve a data capturing, collating, storing and transmission system. Therefore sufficient efforts need to be made to make it a national priority to upgrade data base management systems in order to help government and other agencies to help plan and implement various policies, programs and schemes for the benefit of the farmers.

The Working Group recommends that the government creates a nationally consistent database of all agricultural statistics, meteorological data, which would go a long way in expediting claims processing in crop insurance, and in appropriate design & rating of these

products, not to mention the macro level applications for the government policy making. The broad action plan suggested is:

- (i). Create centralized data management system to accept incoming data from all states
- (ii). Develop practical action strategy to train personnel on data formatting / management procedures as well as new data management system
- (iii). Take existing program data and blend in historical data from all states
- (iv). Clean historical data maintaining both the original values and the 'cleaned' values
- (v). Create a web deployed data visualization tool
- (vi). Develop formal data monitoring / auditing review techniques to be implemented annually

Agriculture Insurance Company of India perhaps could work as the nodal agency on the project with facilitation and support from the government.

## 6. Price Support Measures

The Working Group had detailed discussions with the Commission for Agricultural Costs & Prices (CACP), and experts and stakeholders on MSP based procurement and related issues. The issues are well known and include: benefits only a few States and commodities, does not fully cover the spatial variations in cost of production, procurement machinery doesn't have adequate network, etc.

### 6.1. Introduction

In a country like India, farming is one of the most vulnerable production activities which gets affected immediately, by the adverse actions of nature and humans, making it highly risky. Gains are also not high for the individual farmers due to smallholdings even if a normal/ bumper crop is harvested. Thus this sector is a classic example of “*high risk low return*” activity.

The major risks in an agrarian economy are on account of wide fluctuations in yield and price, which when combined, pose a serious risk to the farmer's income and well-being. Specific adverse agro climatic conditions contribute to the production risks of individual crops, both in irrigated and un-irrigated areas. Also, uncertain supply of agriculture products in relation to their demand, often causes high price volatility in the market. The perishable nature of agricultural commodities, particularly fruits and vegetables, further adds to variability in supplies and prices. Weaknesses of agricultural marketing systems and infrastructure too, contribute to the farmer's risk in price/ income realization. Although, globalization and liberalization are expected to benefit the farmers by creating greater opportunities for better price realisation, the market sometimes exposes them to larger risks as Indian agricultural commodities are little known by internationally, making them dependent more on a push, rather than a pull factor.

Further, the seasonality of production also leads to price volatility when harvested crops reach the markets in very large volumes within a short span of time. When there is a bumper

crop, the farmers find themselves in the buyers market during the peak marketing season, which makes them a price taker. This kind of market often inflicts undue losses, even when they adopt the best available technology and produce efficiently.

It is because of these factors that the policy of assurance of a remunerative and stable price environment has been pursued by the government for long. The specific instruments include, Minimum Support Price (MSP) and Market Intervention Scheme (MIS).

## **6.2. MSP:**

At present, the Government of India announces minimum support prices for 25 major agricultural commodities covering all-important cereals as well as pulses, oilseeds, cotton, jute, sugarcane and tobacco. These take into account several factors including, cost of production, changes in input prices and input- output price parity. However, the MSP mechanism has been criticized on the following grounds:

- Ø It serves only a few States and commodities,
- Ø Subsidy burden due to MSP operation is high
- Ø MSP does not fully cover spatial variations in production costs
- Ø MSP does not fully account for inflation
- Ø There are procedural bottlenecks in effective implementation

A paradigm shift is needed in the post WTO regime, where market forces play a greater role in price discovery and better price realization. Further, the emergence of commodity futures markets, also take care of market uncertainties through price discovery and risk coverage, etc. Therefore, a two price regime i.e. MSP and Procurement Price, will have to be brought in to practice in a situation when market prices rule considerably higher than the MSP. This would imply that in a year of low production, a procurement price closer to the market price would have to be offered to the farmers rather than MSP.

The need to strengthen the operation of MSP across regions and crops is vital. While a larger share of wheat and rice procurement by the Government was due to active involvement of State agencies in Punjab and Haryana, change is being witnessed with the introduction of a decentralized procurement policy in 1997-98. For instance, during

2005-06, Chhattisgarh became the third largest contributor to the procurement of paddy. States like West Bengal and Orissa also contributed to the procurement at much larger scale. With the diversification of agriculture, other crops, such as Copra, Cotton, Tur, Rapeseed and Mustard, Safflower were also the beneficiary of MSP intervention. However, in terms of area coverage and volume of market surplus, these crops are relatively minor compared to the wheat and rice. The position of production and procurement for various agricultural commodities is given in Table-20, below:

**Table-20: Procurement & Production of Selected Commodities (2004-05)**

Commodity	Production (lakh tonnes)	MSR (lakh tonnes)	Marketed Surplus (lakh tonnes)	Procurement to Marketed Surplus	Procurement	Major Procuring States
Wheat*	686.37	67.70	464.67	147.85	31.82 %	Punjab, Haryana, UP, MP
Rice	831.32	75.00	623.49	265.50	42.58 %	Punjab, AP, UP, Haryana, WB
Bajra	7.93	66.70	5.29	0.05	0.95%	Rajasthan, Haryana
Maize	14.18	77.50	10.99	1.01	9.19%	AP, Karnataka, MP
Mustard*	75.93	86.00	65.30	20.93	32.05 %	Rajasthan, Haryana, UP, MP, Gujarat
Cotton\$	164.29	97.60	160.35	27.89	17.39 %	Haryana, Punjab, Maharashtra, Gujarat, AP, MP, Karnataka

**Symbols**

\*:- Procurement during 2005-06 & Production for 2004-05

\$:- Procurement & Production in lakh bales of 170 kgs. each.

MSR:- Marketable Surplus Ratio

It is recognized that MSP interventions at a reasonable level for specific commodities, pushes up prices in the market, benefiting a larger segment of farmers. Obviously, the intention is not to buy the entire marketed surplus on the Government account, since the private players also do their bit.

A trickle down effect on prices is, therefore observed due to such intervention, since demand gets induced during the peak marketing season. This acts horizontally, across the farmers and ensures a reasonable price safeguard. Thus, farmers may not have to subscribe for risk and protection in the market in an MSP regime if implemented efficiently across States and time. However, such an effect is not observed in the case of crops, with a high marketed surplus, such as mustard and cotton.

In view of that the MSP is the major cause for rising food subsidies, which is not true. The entire subsidy does not result into direct benefits to farmers. In fact, in addition to ensuring a reasonable price to the farmers, the subsidy's main objective is to keep the prices depressed in the interest of consumers by maintaining a comprehensive public distribution system and by keeping a buffer stock, from the food security point of view. Also, procurement incidentals are high due to various taxes and levies, which in certain States are as high as 11.5%, of the value of output procured.

The policy of Minimum Support Price has paid rich dividends over the years, in those areas/ States where the mechanism turned out to be effective and reliable. It not only provided relative stability in the prices received by farmers, but also caused a steady growth of their incomes in specific areas. The policy also encouraged adoption of changed cropping pattern and led to adoption of modern farm practices by the farmers.

MSP combined with the price support scheme (PSS), has been a major factor in encouraging farmers to grow more oilseeds. Had there been no PSS, market prices of oilseeds, in particular of mustard, would have fallen much below MSP in the face of bumper production and unabated imports.

In case of cotton, the year 2004-05 witnessed a bumper crop and depressed price scenario in the global market. PSS intervention by CCI was substantial (27.5 lakh bales), which benefited the farmers to a great extent, in a depressed market.

The Working Group felt that MSP needs to stay, as an effective safeguard to protect the interest of the farmers. However, it needs to be made more effective by implementing the following:

- ✓ Larger number of agricultural products be covered under MSP
- ✓ MSP is clearly a risk coverage measure and the Central Government bears the losses. High taxes, mandi fee, cess on various agricultural products have resulted into low price realization by the farmer. Therefore, such charges need to be rationalized and kept within a cap of 4%.
- ✓ Decentralized MSP operations (procurement) need to be encouraged.
- ✓ MSP needs to be universalized, by taking this as a 'bench mark price' for implementing NAIS.
- ✓ NAFED/Central Agency may be given adequate and timely financial support for conducting MSP/PSS operations more effectively.
- ✓ A revolving fund needs to be setup for effective implementation of MSP regime.

### **6.3. Market Intervention Scheme (MIS):**

The Centre implements the Market Intervention Scheme (MIS), on specific requests from the State/UT Governments, to prevent distress sale of horticultural and other cash commodities. Under the scheme, losses are shared by State/UT government and GOI on 50:50 basis, with the ceiling of 25% of the procurement value and rest of the loss, if any, is to be borne by the procurement agency/State Government. The commodities covered under the scheme are onion, potato, ginger, kinoo, red chillies, black pepper, coriander seed, eggs and oil palm. Purchases under MIS are undertaken by NAFED at market Intervention Price (MIP) fixed by GOI. MIP is fixed after taking into account the cost of production and bare minimum margin to provide market support to growers. The MIP fixed by GOI, is generally higher than the prevailing market prices. Thus, the implementing agencies incur losses on account of price and perishable nature of the commodities covered under MIS.

To sum up, MIS too has reported handicaps in the present form. These are:

- (i) Most States do not provide for 50% of the losses.
- (ii) Loss is restricted to 25% of the procurement value and as such, procurement agencies / States do not come forward for MIS operations.
- (iii) Stocks are disposed off at the prevailing market price, which is much below the procurement price. Hence, losses are large
- (iv) MIS is not reliable and sustainable in the present form.

Based on past experience, NAFED has reported that in handling of various agricultural commodities under MIS, the losses incurred are generally more than 25% and in some cases up to 95%, despite meticulous planning and handling of the scheme by the implementing agencies. Some of the reasons for heavy losses under MIS are:

- ✓ Purchases under MIS are always made at a price higher than the prevailing market prices.
- ✓ MIS is generally extended for procurement of perishables, which by nature are susceptible to a higher percentage of spoilage and damages during handling.
- ✓ Procured stocks have to be disposed of at prevailing market rates, which are generally far below the cost of procurement and are governed by market forces of demand and supply.
- ✓ Procured stocks are not immediately or simultaneously disposed of, as this may further subdue the market prices, affecting sales realization. Consequent compulsion of holding the procured stock, jacks up the cost on account of storage rentals, interest and shortages during the storage.
- ✓ Geographic, weather and market conditions prevailing both at the time of procurement and disposal, also largely influence market prices.

The losses suffered under MIS are largely on account of these factors, which are beyond the control of implementing agencies. To make the scheme sustainable and meaningful for risk coverage, the Government needs to reimburse the losses on actual basis as in the case of MSP. Further, the scheme is required to be implemented on the lines of MSP so that the production of horticulture crops and other perishables could be encouraged. However, a proper institutional linkage and coordination with processing / user industries

is also needed to be worked out to provide a ready market for such products to keep the losses to the minimum. MIS should be supplemented by NAIS to ensure a fixed income to the farmers, in a situation of undue fluctuations in price and crop damage.

In order to make MIS effective, the Working Group suggests the following measures:

- (i) Prices be fixed by an Expert Body, basically to cover the price risk.
- (ii) Reimburse the losses on an actual basis to the procurement agencies, on the lines of MSP.
- (iii) Establish dependable linkages and coordination with processing / user industries, to provide ready markets, so that losses could be kept to the minimum.

#### **6.4. Scheme for Tribals:**

Adequate arrangements for price/income support for agriculture/forest produce in tribal dominated areas are poor. Non-Timber Forest Products (NTFP), which contribute significantly to the food basket of millions of tribals, are not covered. Out of 600 districts, some 100 districts with a significant tribal population, are spread across Rajasthan, Gujarat, Maharashtra, M.P., Chhattisgarh, Orissa, Jharkhand, and W.B. These account for more than 70%, of the total tribal population in India. Rainfall varies from 600 mm to 1500 mm in these areas. Most of the tribal people in these regions grow only one crop based on the rainfall, that too paddy, minor cereals, maize or a mixture of sorghum and paddy. To cover this huge marginalized population's risk is another issue.

#### **6.5. Price Stabilization Fund**

**The Price Stabilization Fund** was established by the Ministry of Commerce, based on a report of the NCAER, for four plantation crops - Tea, Coffee, Rubber and Tobacco. A price spectrum band is announced every year, by taking in to account a seven year moving average of international prices, for the four plantation crops. If the domestic price

is between -20 per cent and + 20 per cent of the moving average price, then the year is categorized as normal year , if it is below 20 per cent the year is a distress year, and if it is above 20 per cent, the year is a boom year. In boom year, farmers will have to contribute Rs.1000 (upto 4 hectares) to the price stabilization fund account , while in distress years, the Government of India will contribute Rs.1000/-, and in normal year the contribution will be Rs.500/ each from the Government of India, as well as by the farmers. The scheme was introduced in 2003, to address the price fluctuations in the post WTO period

The present scheme is not attractive, due to inherent problems in scheme design. The amount of assistance provided is very small, and the scheme needs to be restructured, in combination with an insurance scheme. The modifications suggested for the scheme are the following:

- ✓ Area based slabs needed ,instead of a uniform slab of Rs.1,000 for all growers up to 4 hectares
- ✓ Crop specific support, to be linked to the cost of production & acreage
- ✓ A minimum support of Rs.5000/ha. may be assured, for plantation crops
- ✓ Grower contribution to be reduced in boom years, while government share increased in distress years.
- ✓ More crops to be added like coconut, pepper, cashew nut, etc
- ✓ Better incentivisation offered, to motivate farmers to deposit in the account
- ✓ Variable deposits may be permitted for growers
- ✓ Detailed reexamination of the scheme is required including for linking it to crop insurance.

## **6.6. Credit Risk Fund**

The constitution of a Credit Risk Fund, will specially help meet debt repayments, when commodity prices fall. It would reduce defaults and ameliorate repayment related issues, which have been leading to the suicide by farmers. It is designed to smoothen the negative effects of

earning shortfalls, based on gross sum of shortfalls in income for individual crops resulting out of price decline.

The scheme is designed for those, who have availed credit from scheduled commercial banks. It is based on the original loan appraisal report of the financial institutions. For estimating credit worthiness, a particular price and production from the enterprise is used. If the earning plunges below a threshold level of income from a particular crop, for which the loan was availed, due to fall in commodity prices, farmers will become eligible for assistance. The threshold level is suggested as 10% fall in income when initiating repayment, from the appraised amount at the time of loan sanction. Fall in prices alone, will be accounted for in the scheme, to calculate the threshold value of income. Farm harvest prices would be taken as the benchmark price, while calculating income. This price is published for different districts, by the Department of Economics and Statistics, of the state concerned.

The assistance will be in the form of an interest free amount, limited to a maximum of 50% of the loan, further capped at Rs. 50,000/-. The amount will be debited against the loan amount, and will be made available directly to the financial institution, which will help to eventually avoid issues connected with non repayment of loans. This amount will be treated as an advance amount to the farmer, to repay the principal and interest. The remaining 50 per cent amount will have to be raised by the farmers.

The farmer will have to pay back the amount within a maximum period of five years, based on the gravity of the crisis. Eligible crops and districts, may be decided at the state level, dependent on the severity of the crisis. Strict norms could be laid out in deciding the crops and areas covered, like down ward movement in prices for at least 2 years, etc.

A corpus fund has to be established with contributions from the Government of India, State Government and Financial institutions, preferably in the proportion of 20 % : 40% : 40 % respectively. The initial corpus, may be about Rs.4,000 crores.

The total amount of outstanding credit to farmers, is shown in Table-21, below. The corpus amount is suggested to address crop specific credit alone, in crisis affected districts of the country. It must be noted, that the outstanding credit to small and marginal farmers, together accounted for 50 per cent of the total, during 2003-04.

**Table 21: Out-standing credit of farmers to Scheduled Commercial banks**

Year.	( Rs.crores)			
	Marginal farmers ( Upto 1 ha)	Small farmers (1 ha to 2 ha)	Large farmers ( Above 2 ha)	Total
2000-01	7214.8	7308.3	16962.9	31486.0
2001-02	8759.1	9686.4	19083.4	37528.9
2002-03	9813.3	11316.3	23830.9	44960.5
2003-04	14804.6	13974.3	28785.7	57564.6

*Source: Handbook on Statistics of Indian Economy, RBI 2006*

A number of Commercial Banks have provisions for social banking. These provisions, could also be utilized for this purpose, considering the social dimension. The amount could be used for addressing credit related issues, in distress affected districts . Eligible small and marginal farmers, would be supported from the fund.

### **Eligibility Criteria**

- (i) Small and marginal farmers who have availed loans from commercial banks on a priority basis.
- (ii) Fall in income from the appraised amount should be more than 10%.

The suggested slabs are

Fall in income 10-20%	-	25% of loan amount.
More than 20% fall	-	upto 50% of loan amount limited to Rs. 50,000/-

## **Fund Management**

A trust may have to be created by willing Commercial Bank/NABARD, for the management of the fund. About 10% of the fund, may be invested in the market . The income from the investment could be utilized, for meeting operational expenses, for the implementation of the scheme. However, the exact share required for allowing investment could be decided in consultation with the fund management agency, by taking into account the possible revenue and costs of implementation. Another 30 per cent, could be retained as the reserve amount of the fund. More detailed analysis is required, to decide the minimum share allowed for investment as well as the minimum reserve amount to ensure sustainability of the fund. Other possibilities of growth of the fund, through non budgetary measures, could also be examined.

At the national level, a committee under the chairmanship of the Minister (Agriculture), with representatives from the Reserve Bank of India, NABARD, Secretaries from the Ministries of Finance, Agriculture and Planning Commission, could be constituted for deciding the state level allocation and for framing guidelines. At the state level, a committee under the chairmanship of the Chief Secretary, with secretaries from Planning, Finance, APC, Director (DES), representatives of the Reserve bank of India, NABARD, SLBC, etc., could be constituted for deciding the eligible crops, districts, declaring the average market price for the purpose, etc. The existing State Level Bankers Committee, could monitor the implementation of the fund. At the district level, the District Collector could implement the scheme, with the support of the lead bank manager and District Agricultural Officer. After the preliminary scrutiny at the district level, eligible applications could be sent to the banks concerned, for reappraisal based on the published average market price for the purpose, by the district level committee. Once the eligible applicants and amount are decided, the advance amount could be credited directly by the Trust fund, to the farmer's loan account. The farmer has to repay the amount to the bank, after the period of advance for the settlement of the entire credit. Repayment may be made, in the same credit institution itself. Some agreement has to be obtained from the borrowers to this end. A supportive recovery mechanism may also be introduced, by

linking this, with future credit from any financial institution and assistance from various schemes of Panchayats/ departments.

On a pilot basis the scheme could be introduced in two Plantation crop dominated districts each, from Kerala, Tamil Nadu, Andhra Pradesh, Karnataka, Maharashtra and Assam. The scheme is more relevant for plantation crops, due to the prolonged agrarian crisis in these states. Based on the success of the pilot, the scheme could be extended to other states and for other crops, if required.

## 7. Emerging Commodity Markets

**7.1. Introduction:** Presently, the Indian farmer has a well defined system of functioning, wherein the commission agent or ‘adathiya’, provides the linkages needed for cultivation as well as buyback. While the system has been in vogue for a longtime, the cost to the farmer is high, as he loses between 10-15% of the value of his produce to the agent. Certain services provided by the adathiya in the form of credit, insurance, fixed price, transportation, storage and buyback, have however kept this system going in the villages.

The question is whether or not we can replicate the same facilities with greater efficiency. Thereby lowering transaction costs, such that the farmer receives a better price, along with the accompanying benefits, within an institutional set-up. The answer lies in the use of commodity exchange platforms to deliver these benefits. This can be at two stages of the farmer’s income time-frame i.e. pre harvest and post harvest.

**7.2 Pre –harvest concerns:** The major risk factors facing the farmers today in the pre-harvest stage are:

- (i) **Price risk:** The farmer is not sure at the point of sowing, about the price he will get at harvest, and his income varies according to the vicissitudes of nature.
- (ii) **Volumetric risk:** He is not sure of the harvest yield – the volume of production. Weather conditions can play truant, and affect his output. Crop insurance and weather insurance schemes are only gradually spreading, and are not all-encompassing as yet.
- (iii) **Credit availability:** While banks do lend as part of priority sector lending, the ability of the farmer to repay the loans depends on his income, which is subject to both price and volumetric risk. Moreover, banks take a cautious approach as they do not have any control over the cash flow and payment received by the farmers, on the sale of their produce. More favorable terms of credit may be obtained, in case these two risks are taken care of by other institutions.

Farmers can sell their produce forward on the exchanges after sowing their seeds. Ideally, they should be dealing in options rather than futures, which are presently not permitted

by the extant legal structure. Futures, provide the farmers well before harvesting, a firm price in advance, realizable when harvesting does take place. Futures assure farmers, of a firm realization level. Thus, they mitigate the price risk that the farmer runs. Farmers then do not have an exaggerated notion of the expected value of realization and do not contract debts, disproportionate to realistically possible realization levels. This leaves the third risk, the volumetric risk to be covered. Exchanges can launch weather derivatives i.e. rainfall indices relevant to each meteorological zone, so that farmers can use it as a buffer against yield deviations, from normal weather.

If the farmer wants to sell in the futures markets, he can take a position on the commodity exchange, and simultaneously lodge the goods in the accredited warehouse of the exchange. The goods once accepted, after being graded and certified by an assaying agency, move in an electronic commodity balance, which is a substitute for the physical warehouse receipt practice of today. Once they deposit commodities in accredited warehouses, farmers, if they desire may not take a position on the futures platform. If the position on futures platform is not taken, the farmer may avail a bank loan up to say 70% of the value of the commodity, in the spot market against warehouse receipts. If a farmer takes a position on the future/spot exchange, his bank account can be credited, after taking into account the interest burden for financing, margins, mark-to-market (M2M) provisions of the exchange and warehouse charges, till the expiry date of the contract. If the regulator for this space, the Forward Markets Commission (FMC) permits, the physical deliveries made by the farmer, can be considered as early pay-ins and margin and M2M requirements may be waived, under special circumstances. This system assures full repayment of bank loans, thus covering credit risk. In the process, the quality of the asset also gets upgraded and the cost of credit comes down.

Looking ahead, futures prices can also be used by farmers as signaling devices for determining crop sowing patterns. Decisions on sowing, may be taken based on futures, rather than spot prices, to enable better returns at the time of harvest.

Futures trading platforms can be used to provide effective risk-cover to farmers, on both the price and volume ends and further between future and spot prices, in a seamless manner. While, commodity exchanges may not be a panacea for all risk related issues of the farmers, their platforms can be effectively harnessed, to deliver effective results, along with other risk mitigation measures such as contract farming, product diversification, market development, etc.

**7.3.Post-harvest concerns:** The major risk factors facing the farmers today in the post-harvest stage are:

- (i) Whether the farmer should sell his produce in the spot market or the futures market. To give him this choice, so that he derives the best price, robust warehousing and grading/assaying facilities are needed, in proximate areas. Also, credit flows are needed, so that while futures sales are effected later, his intermediate cash flow requirements are met by bank loans.
- (ii) If selling in the spot market, which spot market should he be selling in? Transparency of pricing and separation of sale and physical delivery elements, would help farmers.

#### **7.4. Commodity futures trading:**

Commodity futures trading is regulated under the provisions of the Forward Contracts (Regulation) Act, 1952 (FCR Act). Forward Markets Commission (FMC) is the Market regulator set up under the Act in 1953. At present, there are 103 commodities notified for commodity futures trading. Trading is conducted through 24 recognized Exchanges including three National Multi-Commodity Exchanges viz. National Commodity & Derivatives Exchange Ltd. (NCDEX), Mumbai; Multi Commodity Exchange of India Ltd.(MCX), Mumbai and National Multi-Commodity Exchange of India Ltd.(NMCE), Ahmedabad, are de-mutualised and corporatised from the beginning with professional management and are networked for nation-wide on-line trading. There are three tiers of

regulation of commodities forward trading in India viz. the Central Government, FMC and the Recognized Commodity Exchanges/ Associations.

The Central Government broadly determines the policy as to commodities and the territory, in which futures / forward trading is to be permitted, and the recognition of Exchange / Association through whom such trading is to be permitted.

FMC acts as the regulator, to ensure totally transparent and unbiased trading. Speculation is essential in the commodity futures market for various reasons. However, excessive speculation would distort the functioning of the futures market and would result in manipulation of prices.

With the liberalization of commodity futures market w.e.f April 2003, trade value increased from Rs.1.29 lakh crores in 2003-04 to Rs. 5.75 lakh crores in 2004-05, and to Rs. 21.34 lakh crores in 05-06. This is a 16.5 fold increase in trade within 3 years, depicting immense business opportunities for various stake holders. In the current financial year, the value of trade had reached Rs.15.63 lakh crores till 31.8. 2006.

Futures contracts are expected to perform two important functions - price discovery and price risk management for a given commodity. Futures trading enables various persons such as producers, processors, exporters to hedge risks arising out of price fluctuations.

Futures markets also help farmers, in taking pre sowing and post harvest decisions. Futures trading, also renders services to farmers. Hedging facilities enable those farmers who grow commodities in very large quantities, to hold on to their crops or stocks, spread out the sales of such stocks over a period and thus, get better average prices. A futures market provides price indication to the farmers in advance, before the sowing and marketing season. This may enable them to undertake proper crop planning, apart from spreading out sales over a period of time.

Smaller farmers do not directly participate in the futures market. However, they can also benefit through better price realization on the basis of future prices, for their produce. Futures trading also brings about an element of stability, in seasonal price fluctuations.

Commodities futures markets are still at a nascent stage in India, and the FMC, therefore, has been playing both a regulatory and a developmental role. The Forward Contracts (Regulation) Amendment Bill, 2006, which was introduced in Lok Sabha on 21<sup>st</sup> March, 2006, proposes to make provisions for allowing trading in options in goods or commodity derivatives and to make FMC, an autonomous and more effective Regulator.

### **7.5. Recommendations**

Since farmers have no control, over the prices they receive for their crops, they can hedge by taking a position in the futures market and insure against adverse fluctuations in prices in the physical market. However, due to the predominance of small and marginal farmers, lack of awareness and other restrictions, so far there is a negligible participation of Indian farmers in the commodity futures market. The following measures are suggested to encourage the participation of farmers in the futures markets for the purpose of hedging:

- Ø Encourage aggregators to work for the benefit of small and marginal farmers. The banking and cooperative institutions and farmers' SHGs, could play this role and hedge in the futures market, on the line of mutual funds in capital markets. Aggregators can hedge on behalf of the farmers in the futures market, as they have the requisite knowledge and operational skills needed to participate in the futures market.
- Ø The Government should permit options trading. Hedging through options is considered to be more convenient to farmers, as compared to futures. Options involve one time premium payment, and farmers can gain, if prices move upwards while in a situation of downward moving prices, they are protected against losses.
- Ø In order to generate awareness and sensitize the farming community about the benefits and operational issues of commodity futures trading, the Government should strengthen awareness campaigns across the country.
- Ø To benefit farmers from the futures market, warehousing infrastructure near the production centers must be upgraded and strengthened. Grading and standardization norms also need to be reviewed and enforced. Negotiability of the

- warehouse receipt has to be backed by an Act. Therefore, the Warehousing Development and Regulation Bill, 2005 needs to be enacted without further delay.
- Ø A more effective mechanism must be developed by FMC to take timely measures, so that the prices are not allowed to fluctuate violently, leading to unreasonable spreads between producers and consumers.

Stations can be positioned at commodity specific locations, so that data-requirement of the insurance companies can be met, to facilitate the automatic settlement of insurance claims against crop failures.

Farmers under special schemes such as watershed development programs, DPAP, DPIIP, where farmers federate as self-help-groups or common-interest-groups with the help of government agencies or NGOs, can be provided access to commodity exchanges.

State Cooperative Marketing Federations, can play an important role in aggregating farmers produce and taking informed decision on commodity exchanges.

- Ø APMC laws to be suitably amended, to allow private players to set up e-mandis, and to permit competition amongst the existing mandis. This would bring better processes, transparency and benefits to farmers.
- Ø Price information should be made available at all places accessible to farmers. The Plan should make allocation for such electronic ticker boards in villages in a phased manner. Greater use of the agri-networks and call centers established by the DAC, need to be fostered, through greater awareness. Public private partnerships may also be considered, involving private players, assisting in reduction of governmental costs in this regard. The use of e-governance kiosks at subsidized rates, co funded by private and public sponsors could provide a very viable and sustainable mechanism.
- Ø Exchange terminals must be widely dispersed. Presently there are around 15,000 terminals, which need to be increased manifold to enable such transactions.

## **7.6 International Trade:**

The Working Group also looked at issues concerning international trade. The suggestions made for minimizing risks are as follows:

- (i) Global agricultural trade has several imperfections, which provide unfair advantages to developed countries and diminish the comparative advantage, of domestic production in developing countries. Effective WTO trade negotiations, for establishing a fairer trade regime need to be vigorously pursued.
- (ii) In the event of major hurdles in WTO negotiations and delay in reaching a substantive agreement, India should explore its second-best option, of reaching bilateral / regional trade agreements, with major trading countries in the region and beyond.
- (iii) Further, to exploit the full potential of trade liberalization, India should carry out “behind the border” reforms, by integrating its own domestic markets, institutions, and infrastructure development..

## 8. Contract Farming as Price Risk Mitigation

### 8.1. Introduction

Contract farming is a contractual arrangement between farmers and the processor, whether oral or written, specifying one or more conditions of production and/or marketing of an agricultural produce. Many types of contract farming arrangements exist, based on the nature of risk sharing and contract specifications. They can be classified into 3 broad categories.

First, is the **market specification contract**, where the contract is a pre-harvest arrangement that binds the firm and grower, to a particular set of conditions governing the sale of the crop. These conditions often specify price, quality and timing of delivery of the produce. These types of contracts are common in the case of orchards.

The second one is the **resource providing contract**, where the contracting firms supplies production inputs, extension and credit, in exchange for a marketing arrangement. .

The last one, is the **management and income guaranteeing contract**, which includes the production and marketing stipulations, of the former two types. In addition, market and price risks are transferred from the farmer to the firm, and the farmer is assured of a certain level of revenue. However, the contracting firms, take a substantial part of the managerial responsibility of the farmer. These types of contracts are common in the case of the poultry industry.

The price in contract farming is determined in two ways, through fixed price and through formula price contracts. The former fixes price in advance. It generally increases risk for the firm- buyer, and guarantees a floor price for the farmer. The latter calculates price as a residual, after subtracting processors' costs from revenues obtained. Another locus of any contract is its capacity to shape, regulate and discipline the production and labour process, of the grower. Many contracts specify, that growers adhere to specific farming

practices prescribed by the firm. These specifications frequently surface as points of friction, between growers and processor-buyers. The feasibility of enforcement, depends largely on the strength of legal institutions and political circumstances.

Agribusiness companies need an assured and regular inflow of supplies, to operate their processing facilities efficiently and often, they require the commodities to be processed to satisfy certain quality standards. The conditions that favour contracting are an opportunity for reducing price & sales volume uncertainties, the need for the standardised farm produce by the firms, inability of spot market to provide such produce, etc. Of the broader motives of contracting, avoiding conflicts over land ownership and labour issues, are probably equally important. For crops requiring much labour and careful attention, small holder production, may be more efficient than plantations.

From the viewpoint of farmers, contract farming is a mechanism to overcome institutional and market failures, that are prevalent in agriculture in the developing countries. Market failure or imperfect markets for technology, credit, insurance, information, factors of production and final product, are identified as the factors that influence the farmer, to go in for contract farming. Factors like transaction cost, local organizations and crop characteristics, influence both the farmer and contracting firms.

Irrespective of demand, there are certain technical characteristics that make some crops more suited for contract farming. These are perishability, bulkiness, permanence, need for processing and variations in quality. Perishable crops need to be processed quickly and need elaborate collection systems. The setting up of such systems can be done more easily, when risks are reduced through contracts. Bulky crops such as fruits and vegetables, are the most likely commodities for contract farming. Permanent and semi permanent crops are also more suited than annual crops, for contract farming. The reason is that growers of coffee, tea and similar crops, cannot easily abandon production and so are locked into a relationship with the processor. Crops requiring extensive processing are most appealing to agribusiness, which can then use its processing facilities, to discipline suppliers. Crops that vary significantly in quality and for which quality is

important, are also suited for contract production. Many crops produced under contract farming, occupy special market niches that are subject to strong international forces.

Contracts often require firms to supply credit, input, technology, extension and surveillance support, as well as provide for stipulated price and resolution of conflict. The farmers have to supply the right quality output and adhere to the package of practices and other terms of the contract. End market requirements and government policies affect firms in a contract farming situation and price in open market, experience in contract farming, knowledge level and natural calamities, affect farmers.

**8.2. Contract Farming and risk management** Contract farming is used as a risk management instrument. Contract farming is suitable for certain commodities and market situations, as discussed earlier. Facilitation of contract farming, requires support in terms of changes in legislation such as APMC Act, offering effective mechanism to resolve conflict such as registration of contract at APMC level and having an arbitration body for resolving conflict and providing quality checking facilities. Proper design of the contract, can make contract farming more attractive. While designing flexible forms of contracts, combining them with insurance, futures and credit options, may make them more attractive to many farming situations. Education and training on contract farming, should be provided extensively to companies and other government agencies.

Government should encourage contract farming for these situations, through appropriate legislation and facilitation, through a demand driven approach.

### **8.3. Recommendations:**

- (i) Contract farming should be popularised as an alternative risk management instrument.
- (ii) Facilitation of contract farming requires support in terms of changes in legislation e.g. APMC Act, mechanism to resolve conflict and providing quality control facilities.

- (iii) While designing flexible forms of pricing, combining insurance and futures as well, may make it more attractive to the farming community.
- (iv) Education, training and awareness building, on contract farming should be provided extensively to companies, government agencies as well as farming communities.
- (v) The processor/procurer in the contract farming arrangement, needs to be responsible for effective backward & forward linkages, keeping in view the interests of the farmers, as well as the business interest of the management.

#### **8.4. Bio fuels:**

Commercial cultivation of Bio-fuel trees / plants has of late drawn the attention of farmers as well as corporates because of their income enhancing potential as also environmental issues such as climate change. There are other reasons, which make bio-fuel trees cultivation particularly, Jatropha attractive and remunerative for farmers, which are highlighted in Box-6, in the following page:

### **Box-6: Bio-fuels for higher farm incomes and rural energy security**

- Jatropha for higher farm incomes and rural energy security
- Bio-fuels are renewable liquid fuels coming from biological raw materials and have been proved to be good substitutes for oil in the transportation sector. As such bio-fuels – ethanol and bio-diesel – are gaining worldwide acceptance as a solution to environmental problems, energy security, reducing imports, rural employment and improving agricultural economy.
- Bio-diesel is made from vegetable oils (both edible & non-edible) and animal fats through trans-esterification and is a diesel substitute and requires very little or no engine modifications up to 20% blend and minor modification for higher percentage blends. The use of bio-diesel results in substantial reduction of un-burnt hydrocarbons, carbon monoxide and particulate matters. It has almost no sulphur, no aromatics and has about 10% built in oxygen, which helps it to burn fully. Its higher cetane number improves the combustion.
- Sunflower and rapeseed are the raw materials used in Europe whereas soyabean is used in USA. Thailand uses palm oil, Ireland uses frying oil and animal fats. India proposes large scale cultivation of Jatropha for meeting the demand for bio-diesel by establishing a National Mission on Bio-diesel.
- Jatropha is non – browsable by cattle and animals and hence, its cultivation in areas with high biotic pressure, can be taken up without any risk.
- Jatropha and other bio-fuel trees can be cultivated in a wide variety of soils. Hence, they can be readily grown in wastelands and lands with lower productivity.
- Jatropha being a drought tolerant crop, can withstand long spells of drought. Thus, the risk of total crop failure and replanting is minimized to a great extent.
- The shelf life of the economic produce of Jatropha i.e, seeds for the purpose of oil extraction is considerably long.
- Jatropha normally yields twice a year and in case of well managed plantations, in addition to the normal two harvests, an additional harvest is very much possible. Thus, the risk / uncertainty, pertaining to sustained yield is significantly reduced.
- Economic yield in Jatropha commences from the fifth years after planting. However, during the initial years, intercrops can be cultivated in between rows of Jatropha. Jatropha is compatible with a wide range of agricultural crops, and the income from the intercrops provides substantial returns.
- Decentralized energy production through captive Jatropha plantations in rural areas will have beneficial impact on socio-economic conditions in the rural areas.
- Bio-fuels (ethanol and bio-diesels) will create significantly higher demand for agricultural commodities which will enable farmers to have stable income source including through higher commodity prices.
- Second generation bio-fuels based on cellulose contained in low value bio-mass sources such as agriculture crop residues from maize, wheat, rice as well as residues from pasture and forests when commercialised would generate employment on farm as well as in bio-fuel value chain, reduce energy cost for farmers and would ensure rural energy security in the country.

## **9. Setting up Centre for Risk Management in Agriculture (CRMA)**

Gradual transformation of Indian agriculture in the recent decades impelled by technological advances and farmers aspirations to better standard of life entailed adoption of high value input based intensive farming systems.

The uncertainties inherent with farming activities such as weather, incidence of pest and diseases, market, price etc. have further exacerbated the vulnerability of high input intensive farming. The high risk agriculture without buffering mechanisms against weather aberrations, market fluctuations and other uncertainties have rendered farming activity as an economically unviable venture leading to drastic manifestations such as farmers suicides.

The farm families in India today are facing multiple risks threatening their livelihood and income security. The uncertainties associated with climate, market, price, incidence of pest and diseases also undermine the socio-economic development in rural areas. These abnormalities are already causing widespread damage to assets and loss to the crops and agricultural produce. The farm families are deterred from adopting modern practices as part of their effort to maximize their profits.

Economic motivation among the farmers as a result of green revolution encourages the farmers to invest more in high intensive farming systems. Changing socio-economic and environmental scenarios lead to magnified uncertainties and risks. For instance, farmers forward sell their produce to the money lenders in order to get money for their financial requirement and input costs. Farmers also borrow funds from the big land owners and money lenders to invest in their high intensive agricultural systems. As the intensive agriculture is vulnerable to widespread damage from various risks, the farmers are unable to repay their borrowings.. Further, enhanced economic activities in the urban centres attract the potential farm workforce and young farmers to migrate, leaving the vulnerable populations like women and elders to farm. Insufficient storage facilities and post harvest processes also add to further loss of produce. There are frequent instances the harvested produce being damaged due to natural disasters.

### **9.1. Role of Institutional Mechanisms:**

It is well recognized that accurate and timely information about weather, climate, input, market and finance are essential to manage the risk of crop damage and income losses

through pro-active management plans. The information is useful in proper planning of farm activities like sowing, timing of irrigation, fertilizer and pesticides application, harvesting, as well as in effective preparation and installation of farm-protection devices and other mitigating measures. Though existing sources of information are capable of drawing strategic decision responses in agriculture, the need for proper understanding on the impacts have long been recognized. Wider adoption of the multiple risk management tools to sectoral decision-makers in Indian agriculture would be a major breakthrough for socio-economic development in rural areas.

In rural development policies and programmes, greater attention is given to manage the resources without targeting underlying risks. Several academic institutions, central and state extension organizations, non-governmental organizations, rural development institutions, nationalized credit institutes, local cooperatives are in place to address these risks independently. As the farming risks are in multiple dimensions, the development programmes with independent objectives seldom matches with the requirement of farmers.

Efforts are underway to make production, market and price forecasts based on the linear relationships and available monitoring systems for the last few decades. However, the methods are not robust and need considerable improvement through non-linear frameworks so as to give appropriate risk management strategies. Linking of weather, climate, pest and diseases, market, price, subsidies and other external factors are essential to meet the challenges of seasonal and year-to-year fluctuations.

Finance institutions and development programmes have become an increasingly important component of rural development to create employment, reduce poverty or to promote micro-enterprise development in agriculture sector. These credits programmes have to target vulnerable groups, as they have minimum access to economic resources and make a firm impact on social, legal, economic, political position.. Due to high interest rates insisted by the local money lenders, the farm households need to pay at times upto 60% of their produce. Though solidarity group model, cooperative credit model, individual lending model are very common in India, it requires additional capacity building activities to the rural service organizations to facilitate appropriate financial risk management strategies.

## **9.2. Establishment of Centre for Risk Management in Agriculture:**

A reconnaissance analysis with the farmers, intermediaries, and Government service organizations has offered scope for creating integrated risk management systems that could help the farmers to manage the multiple risks in a coherent manner. To manage these risks it is required to develop a strong institutional system at community and local Government level. Institutional support to the small and marginal farmers is more than a vehicle of risk management and economic progress. It is an instrument of policy which can influence the patterns of land use, income distribution and solution to declining natural resources.

Recent advances in information technology, weather prediction and financial risk management instruments offer potential opportunities to develop and deliver innovative, need based risk management tools to enable farming communities to take informed decisions. Through underlying risk management principles, an integrated risk management framework need to be evolved through targeted research and transferred to rural development and agriculture service organizations. The tools and methods of integrated risk management should be mainstreamed into development planning through advocacy and capacity building programmes. To achieve these objectives, a unique institution “Center for Integrated Risk Management in Agriculture (CRMA) is proposed in public-private partnership

The CRMA is envisioned to play a catalytic role to promote and deliver integrated risk management services to farming community.

The CRMA will be an evolving and dynamic institution to respond to the needs and demands of farming sector to serve as a knowledge management institutions. In the initial years CRMA will undertake capacity building programmes to enable farmer frontier support institutions such as banks, insurance institutions, agriculture extensions etc to deliver integrated risk management services..

Centre will work out strategies for climate risk management with an ‘end to end’ perspective. It will concentrate on developing tools, analytical thinking, synthesis of the multidisciplinary work needed, providing training, pilot projects to demonstrate and develop the strategies. The actual implementation of the climate risk management strategies developed by the institute would be the task of governments and other interested / relevant organizations. The institute would work closely with these agencies.

## 10. Wrapping up

In concluding, the Working Group would like to reiterate the basic objective of ensuring that ultimately the risks of Indian agriculture are pooled, shared and transferred to international capital and reinsurance markets through appropriate market-based instruments like reinsurance, catastrophe bonds and alternative risk transfer mechanisms.

The governments in developing countries such as in India whether central or state, cannot bear all losses arising out of risks in agriculture. Their involvement must necessarily stand restricted to enhancing the coping capacities of the farming communities, institution building, stepping in, in times of catastrophic losses and correcting imbalances to which the agricultural sector is exposed to from time to time on account of its inherent vulnerability.

Accordingly the Working Group has recommended measures for the XI Plan period to strengthen the institutions, systems and mechanisms involved in the mitigation and transfer of agricultural risks, such as:

- è Transition of the Crop Insurance Scheme to an actuarial regime supported by up-front subsidy in premium with insurers taking full responsibility for claims, save catastrophe claims.
- è Strengthening the weather insurance system through technological developments like electronic weather stations and remote sensing technology.
- è Increase in penetration of livestock insurance considering its future potential contribution to rural income growth.
- è To introduce farm income insurance scheme to protect farmers' incomes more comprehensively.
- è To introduce price stabilization fund and credit risks management fund to insulate farmers from price volatility.

- è To manage environmental risks arising from climate variability and change through early warning systems, capacity building of farmers and institutional interventions.
- è To develop institutions like commodity futures, markets, contract farming, agricultural warehousing infrastructure, etc. to mitigate price risks.
- è Recognizing the need to manage the multiple risks in an effective manner a centre for integrated risk management in Agriculture is proposed to be established in public –private partnership.

It is our belief that government initiatives on these lines to strengthen the agricultural sector's risk management capabilities will lead to ushering in a sustainable and remunerative agriculture during the XI Plan Period.