Weather derivatives: A Tool for Agri-Risk Management

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India withstands great variations in weather conditions from region to region due to its vast area and diverse geographical structure. Such diverse weather conditions have a direct or indirect impact on the business processes of many industries. Weather risk affects businesses in diverse economy sectors such as agriculture, construction, energy, insurance, manufacturing, retail, travel, tourism, transportation & many others. The impact of weather on the Indian economy is very significant because agriculture is the backbone of the Indian economy and agriculture in India is largely dependent on monsoons, weather alone accounting for 90% of variability of crop yields. Hence, monsoon deviations have major impact on agricultural output and on the GDP too. Adverse weather risk may be measured by the negative effect of weather on economic output.

There exists an imperative need for hedging the agricultural sector against weather risk. But, the basic issue that arises is how to evolve an appropriate and adequate system of weather risk management for these sectors. Traditional risk hedging tools and techniques have proved to be inadequate to manage the unpredictable weather risk. Weather derivatives are recent tools that are being effectively employed the world over, for weather risk management and control. It is in this context that this study assumes significance and relevance. The main objectives of the study are 1) to assess the drawbacks of agricultural insurance in India and the reasons for its failure, and 2) to examine the feasibility of rainfall derivatives as a risk management tool for Indian agricultural sector. The study tries to explain how agricultural risk can be mitigated using weather derivative contracts and the type of contracts that can be designed for the purpose. The study finds that crop insurance has proved very expensive for the farmers due to the premiums involved. Also, it has been heavily subsidised and is a drain on the budgetary resources. If crops are not insured, massive loan waiver is resorted to in event of crop failure, which is again a huge cost to the national exchequer. In comparison, weather derivatives can serve as an effective and low cost option for managing weather risk in agriculture. However, the effectiveness and success of weather derivatives in India would largely depend on proper design of weather derivative contracts and its successful implementation. If properly implemented, exchange traded weather derivatives can prove to be very effective instruments for hedging weather risks.

Keywords : adverse-weather risk, hedging tool, Multiple peril insurance, monsoon options.

Introduction

Risk is a pervasive characteristic of business. Business is exposed to a variety of controllable & uncontrollable risk factors which impact its performance and survival. Though controllable risks can be technologically managed to an extent, thus reducing or minimising their

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impact on business; the real problem that arises is one of tackling the uncontrollable risks, generally stemming from natural causes. Weather risk is one of the most significant uncontrollable risk factor. Retail trade, small & medium industrial enterprises to huge industrial conglomerates & MNCs - all are exposed to the weather risk in one way or the other. Weather risk affects businesses in diverse economy sectors such as agriculture, construction, energy, insurance, manufacturing, retail, travel, tourism, transportation & many others. The US Department of Commerce has estimated that nearly one-third of the US economy, involving transactions to the extent of nearly $4 trillion, is at risk due to the weather (Dutton J., 2002). Similar estimates may be made in case of other economies and Indian economy is no exception.

India withstands great variations in weather conditions from region to region due to its vast area and diverse geographical structure. Such diverse weather conditions have a direct or indirect impact on the business processes of many industries. There exists an imperative need for hedging these sectors against weather risk. But, the basic issue that arises is how to evolve an appropriate and adequate system of weather risk management for these sectors. Weather derivatives are recent tools that are being effectively employed the world over, for weather risk management and control. Like other risk management techniques, weather derivatives do not reduce the risk per se, but help mitigate the impact of such risks on businesses.

This paper presents an overview of weather risks in the agrarian sector of the Indian economy; the prevalent state of risk management in Indian agriculture and its efficacy; and to examine the feasibility, utility & success of weather derivatives in the context of Indian agricultural scenario.

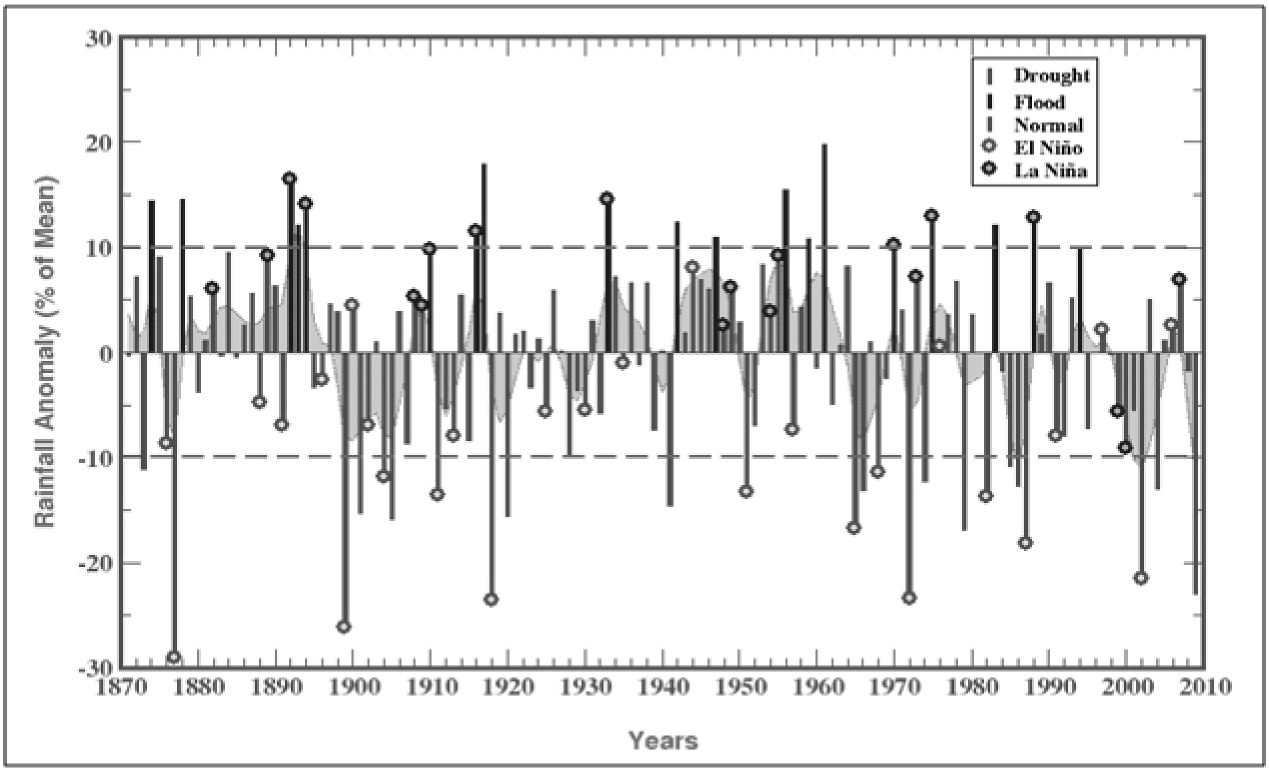
Rationale & Objectives of the Study

The impact of weather on the Indian economy is very significant because agriculture continues to be the backbone of the Indian economy. According to the economic survey 2009-10, agriculture contributes to about 17% of the total GDP of India and agriculture & the related agro industries support around 40% of the population. Agriculture is the source of supply of raw materials to our industries. Agriculture is a significant contributor to India's foreign trade as India is a leading exporter of tea, sugar, oilseeds, tobacco, spices, etc… Agricultural income drives demand for other domestic goods, which in turn drives other capital consumption and sustains demand for other industrial goods. Agriculture and agro industry sector remains the main pillar of India's economy and plays an important role in its overall socio-economic development. But, agriculture in India remains a high-risk prone sector as it largely depends on monsoons, weather alone accounts for 90% of variability of crop yields. Figure 1 shows the anomalies in monsoon rainfall in India over a period of about 140 years, expressed as percent departures from its long-term mean, over more than a century in the past. During the period 1871-2009, there were 19 major flood years, defined as years with AISMR in excess of one standard deviation above the mean (i.e., anomaly exceeding +10%). During the period 1871-2009, there were 24 major drought years, defined as years with AISMR less than one standard deviation below the mean (i.e., anomaly below -10%) (Source: www.tropmet.res.in). Figure 2 shows the spatial distribution of monsoon rains in India.

Even a slight variation in monsoon patterns (relating to both the time and quantum of rainfall) can seriously impact India's agricultural GDP and consequently the economy, as it did in 2002, when a severe drought in many states of India slowed India's GDP to 4% and a good monsoon in 2003 raised it to 8%. Figure 3 relates percentage deviation of rainfall to agriculture GDP growth and shows that rainfall deviations have a major impact on agricultural output. A bad monsoon reduces not only the supply of raw materials but also the

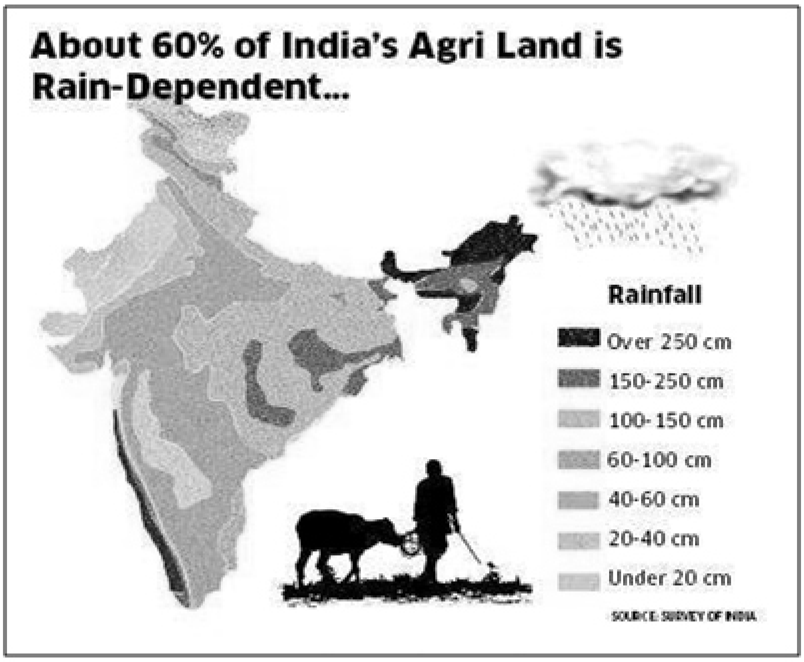
Figure 1 - All India Summer Monsoon Rainfall, 1871-2010

(Based on IITM Homogeneous Indian Monthly Monsoon Data Set)



Source: www.tropmet.res.in

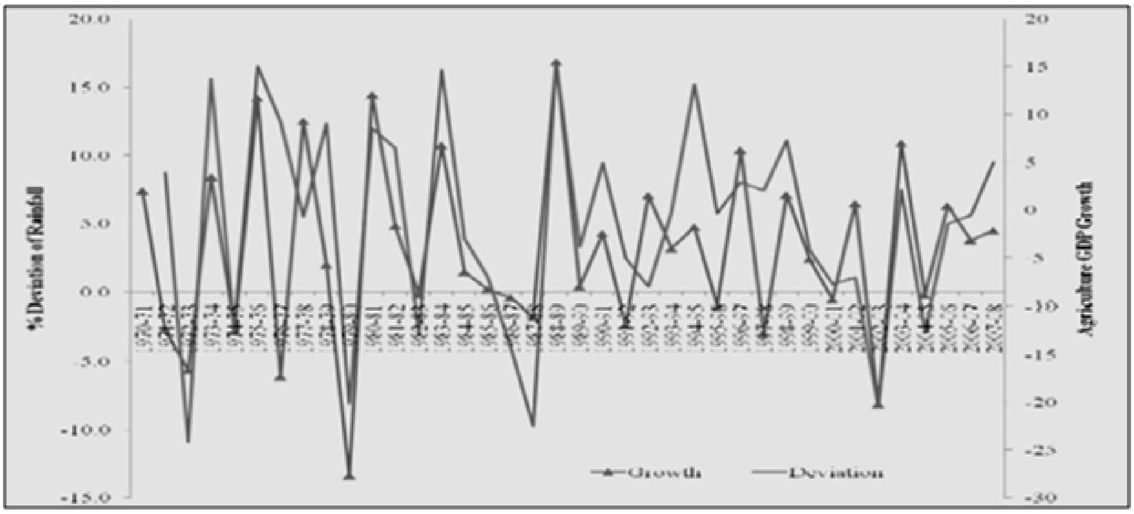
Figure 2



Source: The Economic times, June 2011

disposable income of a large percentage of population and hence, adversely affects the production and consumption, and hence the GDP. It has been estimated that a bad monsoon can wipe out upto 20% of India's agricultural GDP (Sharma A. & Vashishtha A., 2007). About 45% of the variation in India's GDP growth is explained by the fluctuations in rainfall (Virmani A., 2005).

Figure 3



Source: India Economy Outlook 2009-10

This signifies that it is extremely important to manage weather risk in Indian agricultural sector that is highly susceptible to the vagaries of the monsoons.

Traditional risk hedging tools and techniques have proved to be inadequate to manage the unpredictable weather risk (Sharma A. & Vashishtha A., 2007). Hence, innovative instruments like weather derivatives can be used to address weather related risks. It is in this context that this study assumes significance and relevance. The main objectives of the study are:

- To discuss briefly how adverse weather impacts agricultural productivity.
- To examine the current state of risk management in agriculture & drawbacks of the rural insurance schemes.
- To examine the viability/ feasibility of weather derivatives as risk management tools for Indian agricultural sector.
- To examine how weather derivatives can be adapted to Indian conditions.
- Regulatory mechanism & implementation issues.

Literature Review

Weather derivative trading is still not popular in many parts of the world. So there is not much literature available on this subject. Initiated in the 1990s, weather derivatives are slowly growing in popularity due to the increased awareness of the global climatic changes and its impacts. Hence, many academicians, researchers, private & government institutions and scientists are now trying to study the effects of weather & ways to mitigate weather risk. The finance sector is also not far behind and just like carbon trading & power trading, weather trading is also coming into the foresight as a way of hedging risks. Some recent studies are available regarding the effects of weather (i.e. weather sensitivity research) and the use of weather derivatives.

Dutton's study "Opportunities & Priorities in a New Era for Weather & Climate Services", is the most popular study in this field. It relates the sensitivity of weather to various economic sectors and infers that a little more than 30% of the US economy is in some way or the other related to the vagaries of weather. Though popular in the weather trading universe, his work was subjective & does not concretely quantify the weather sensitivity of various sectors.

Larson took ahead the study by Dutton & tried to quantitatively define the effect of weather. In his 2006 study "An Evaluation of the Weather Sensitivity of US Economic Sectors to Weather", he used quantitative techniques like Monte Carlo Simulations, transcendental logarithmic production functions (TRANSLOG) to quantify the effect of weather on different economic sectors & came to the conclusion that the effect of weather was different for different economies in different regions.

Subak et al. studied the effect of weather on the tertiary sectors of United Kingdom-tourism; construction; power; healthcare; real estate & financial services particularly insurance. He took a complete view of these particular sectors & used econometrics to map a relation between weather & these sectors.

Tol did a similar study consisting of more or less the same sectors in Amsterdam, Netherlands.

Spaulding et al in 2003, in his study, "Can weather derivative contracts help mitigate agricultural risk? Microeconomic policy implications for Romania", studied the impact of precipitation derivative contract for Romania and found that those farmers having hedged their risks performed better than their counterparts not only in terms of production but also in terms of net mean returns.

Weather derivatives are still not very popular in India. Research papers & literature relevant to weather derivatives in India are very rare. Most of the work related to the effects of weather on the economy of India consists of studies in crop insurance.

Parshad in his 2007 study titled "The speciality of crop insurance" inferred that to protect against financial losses in agriculture, there needs to be a transition from uncertain risk management practices to modern day risk management strategies.

Sharma Anil K. & Vashishtha Ashutosh in their study titled "Weather derivatives: risk- hedging prospects for agriculture and power sectors in India" in the Journal of Risk Finance (March 22,2007), have examined the effectiveness of weather derivatives as alternative risk management tools in Indian agriculture and inferred that use of appropriate weather derivatives may be more economical way of managing the volume-related weather risk in an economy like India, having predominant agriculture & power sectors.

Seth et al. (2008) have done a theoretical study taking the case of farmers growing

soyabean in Jhalawar district of Rajasthan. An option to hedge the weather risk through purchase of weather derivatives is given in order to determine the theoretical willingness to pay to hedge volumetric risk to yield. Seth et al. (2008) determined this to be 5.47% of the sale price that a farmer would get and the mean willingness to pay to be around 8.8% of the maximum possible payout of a weather derivative contract.

Data

This study has used existing literature (consisting mostly of papers published by foreign authors in developed countries having a weather derivatives market) and relevant available information in Indian context for analyzing the various issues related to risk management in agriculture. Data used has been obtained from secondary sources. Various books, research papers, newspaper articles & white paper issued by government have been referred to for the purposes of the study. Websites of Government of India, Indian Council of Agricultural Research & Education, Agricultural Ministry, Department of Agriculture & Cooperation, Indian Institute of Tropical Meteorology, Economic Survey 2008-09, Agricultural Statistics at a Glance are some of the important source of information, which have been referred to for the purposes of the study.

Adverse Weather Risk & State of Risk Management in Agriculture

Mitigating risk in agriculture is one of the major challenges that policy makers are facing, the world over. Agriculture is vulnerable to many types of risks because of their biophysical nature and influence of natural, external factors on productivity. Weather risk like excess /deficit rainfall or temperature extremes is one of them. Adverse weather conditions can impact crop yields in multiple ways.

a. They can create water imbalance leading to reduced crop yields in a rain-fed area.
b. Extreme weather conditions can damage sensitive crops.
c. Weather conditions like excess humidity or temperature may cause higher pest infestation or disease outbreak in plant.

Adverse weather risk may be measured by the negative effect of weather on economic output. Evidences suggest that economic losses from adverse weather risk are likely to increase in the future. The Wall Street Journal has noted that some parts of the world, including India, are getting as much as 10% less rain than they did in the past due to changing rainfall patterns (www.cmegroup.com). According to it, a continuation of that trend would have major implications for the sustainability of agriculture. Management of agricultural risk is crucial considering its importance in Indian economy and society.

Demerits of Crop Insurance Schemes

Till date, multiple peril crop insurance has been the most popular avenue to manage agricultural risks in India and yet, it accounts for less than two percent of income generated from agriculture in a year. The Agricultural Insurance Company AIC's 30 year old 'National Agricultural Insurance Scheme (NAIS)' is the state-run agriculture insurance scheme. This scheme has been offering insurance cover to core crops & to commercial / horticultural crops (since 1999) and is a pre-requisite for farmers applying for obtaining loans from credit agencies. NAIS covered close to 20 million farmers in 23 Indian states and it covered over 30 different crop types during Kharif & 25 different crops during Rabi season, worth an annual premium of US $150 mn in 2007. But, insurance penetration of the NAIS programme remained low covering merely 10 percent of sown area and seven percent of number of farmers, though the government had subsidised the premium rates (Data Source: IRDA journal Dec 2007). Also, total claims paid were much more than premium collected.

After the failure of NAIS, came the era of index based weather insurance schemes. Two main private insurers - ICICI Lombard General Insurance Company and IFFCO Tokio General Insurance Company (ITGI) are offering rainfall index insurance. These products were marketed to farmers through use of multiple channels like direct selling through rural cooperative banks, or through agri - input suppliers, etc. Table 1 shows the performance of combined output of ICICI Lombard and ITGI.

Since, Rabi 2007, the Government has allowed public and private index insurance programmes to take advantage of subsidies, pending the approval of respective state governments.

Besides, NAIS and Rainfall Index Insurance, AIC also introduced weather index insurance schemes based on precipitation outputs. One such product is "Varsha Bima

Table 1

Year	2003/04	2004/05	2005/06	2006/07	2007/08
ICICI Lombard & ITGI Combined Outputs					
Total no. of farmers insured	1,000	8,000	105,600	181,600	114,678
Total gross premium	410	96,579	835,376	1,068,323	2,522,145
Total sum insured	6,151	1,448,695	14,133,944	17,737,040	41,625,656
Total area insured	1,700	7,850	78,050	99,375	301,350

Source: WFP Report, 2010

rainfall insurance" that offers three types of risk coverage -

- Seasonal rainfall cover- Claim Payment triggered by total rainfall for the whole season being 20 percent less than normal.
- Agronomic index cover - Triggered by 20 percent less rainfall based on the normal amount of rainfall needed at each crop growth stage from planting through harvesting.
- Sowing failure cover - Triggered by rainfall during the sowing season being deficit by 40 percent.

The performance of AIC's index insurance products is shown in Table 2.

Table 2 - Performance of AIC's Index Insurance Products (2004 - 2008)

Product	No of farmers insured	Area insured (ha)	Total sum insured (Rs.)	Premium (Rs.)	Claims (Rs.)
2004-05 Varsha Bima	1,050	2,200	2,620,406	611,656	562,639
2005-06 Varsha Bima	125,453	97,690	558,582,520	31,704,876	1,996,106
2006 – 07 Varsha Bima	12,328	15,873	109,230,588	6,443,885	3,699,995
2007-08 Varsha Bima	8,125	18,120	102,945,362	5,941,415	5,758,651

Source: WFP Report, 2010

But, the table shows that despite a promising 2004 pilot and a good 2005/06 uptake, the number of farmers insured, area & sum insured and premium received under these schemes has been decreasing since the 2006/07 season. These losses in uptake can be attributed to a variety of reasons such as

- lack of strong institutional network of insurers, reinsurers, data service providers & effective delivery channels,

- targetting of large-scale farmers & neglect of marginal farmers by the insurance market,
- undue delays in claim settlement and substantial administrative expenses as agricultural insured are geographically scattered in rural areas and so, administration of insurance schemes and claims is time consuming as well as expensive.
- limited partnership by reinsurance companies due to lack of data, complexity of product structures, relatively low value of coverages & restrictive regulations by IRDA.

Traditional insurance has proven very expensive for the economy considering both monetary & environmental costs. This has been mainly due to two phenomena - adverse selection & moral hazard. Adverse selection means the existence of asymmetric information between the insurer and the insured i.e. the producers have more information on their farms than the insurance agency due to which, the insurer cannot accurately assess the risk of loss and so, is unable to set premiums commensurate with risk. Moral hazard means indulgence in such hidden actions by the insured that increases the likelihood or magnitude of loss, thus increasing the likelihood of collecting indemnity payments. Due to these factors, traditional crop insurance is expensive and unsustainable. Other problems with existing insurance methods involve some intended environmental damages. Keeton, Skees and Long report approximately 15 million new acres being brought into cultivation as a result of subsidized crop insurance in the United States, mostly on lands that would not be normally cultivated (Keeton, Skees and Long, 1999). Furthermore, without massive government subsidies it is extremely difficult to sustain multiple peril risk insurance programmes. The country's fiscal health does not warrant continuation of subsidizing the traditional crop-insurance system any longer.

From the farmer's viewpoint, insurance requires huge premiums. It also requires demonstration or proof of damage or loss. Also, undue delays in claim settlement, small holding sizes, and all crops not classifying to fall under the insurance schemes, are other major drawbacks. Crop insurance is not an easy concept or product to be handled by the insurer or the insured.

Weather Derivatives

Weather derivatives are financial products that enable an organization to offset/reduce the financial risk due to a weather variable. According to Dischel Barrieu, "A financial weather derivative contract may be termed as a weather contingent contract whose payoff will be in an amount of cash determined by future weather events". The settlement value of these weather events is determined from a weather index, which is expressed in terms of values of a weather variable measured at a stated geographical location.

Weather derivatives originated as over-the-counter (OTC) products in the US; the first weather derivative trade was between Enron Corporation and Koch Industries. The world's first exchange traded weather derivatives began trading on September 22, 1999 at the Chicago Mercantile Exchange (CME). Introduction of weather derivative trading helped the weather derivatives to get more popular, transparent and reachable. Today, in US, CME offers weather futures and options (based on temperatures) on 42 cities throughout the world along with futures and options on frost & snowfall.

Weather derivatives are different from other derivative products as the underlying asset is not a physical asset but an intangible i.e. the weather (for e.g., the temperature measured in degree Celsius or Fahrenheit or rainfall measured in centimeters); and there is no relation between the value of the underlying and the price of the weather derivative. In the Chicago Mercantile Exchange normally, the weather derivatives traded are based on temperature. Temperature is measured in the unit of degree days - the deviation of a day's average temperature from the reference. An HDD i.e. heating degree day occurs when the average temperature is below the reference, and a CDD i.e. cooling degree day occurs when the average temperature is above the reference. 65 ? Fahrenheit has been taken as the reference temperature and presently, the CME contracts are based on an index that measures the extent and frequency that the average temperature drops below 65^0 Fahrenheit (the reference). The future contract's payout is $100 per point movement in the index. To ensure transparency and independence in the benchmark, measuring & monitoring of the index HDD, is done by an independent entity - Earth Satellite Corporation.

Since, Indian agriculture is dependent on monsoons, the weather derivatives in India could have monsoon or rainfall as their underlying. In rainfall derivative contracts elsewhere, a rainfall index MRD i.e. millimeter rainy day is taken as the baseline instead of the daily temperatures as used in the European & US markets. Similar index may be adopted for used in India too. If water scarcity caused by insufficient rains leads to decline in agricultural production , weather derivatives could compensate the farmer for the loss, if rainfall recorded at the benchmark weather station is less than the specified index. A rainfall (monsoon) derivative option contract can be described by the following set of elements:

Contract Type: Call /Put Option

Underlying Variable: Monsoon rainfall

Index: The index is the measure of weather variable which governs payouts on the contract. In

Indian context, it can be Cumulative Rainfall measured in mm (calculated on the basis of average of historical rainfall data).

Reference Weather Station: All weather contracts are based on actual observations of the weather variable at a specific weather station. In India, historical weather (daily rainfall) data are available from approximately 1000 Indian Meteorological Department (IMD) weather stations.

Term: All weather contracts have a defined start & end date that define the period over which the underlying index is calculated for e.g., it can be June - October for the Kharif crop.

Premium: The buyer of a weather option pays a premium to the seller (for bearing the risk) which is between 10 to 20% of the notional amount of the contract but can vary depending on the risk profile of the contract.

Strike: The value of the underlying index at which the contract starts to pay out

Tick value : The payout amount per unit increment in the index beyond the strike. It is expressed in Rs.mm.

Payout: Rs….per mm.

Payout from a put option on the rainfall index is taken as:

Payout = $t \times \text{Max}(0, K - x)$

where, K = the strike value

x = actual rainfall

t = tick value.

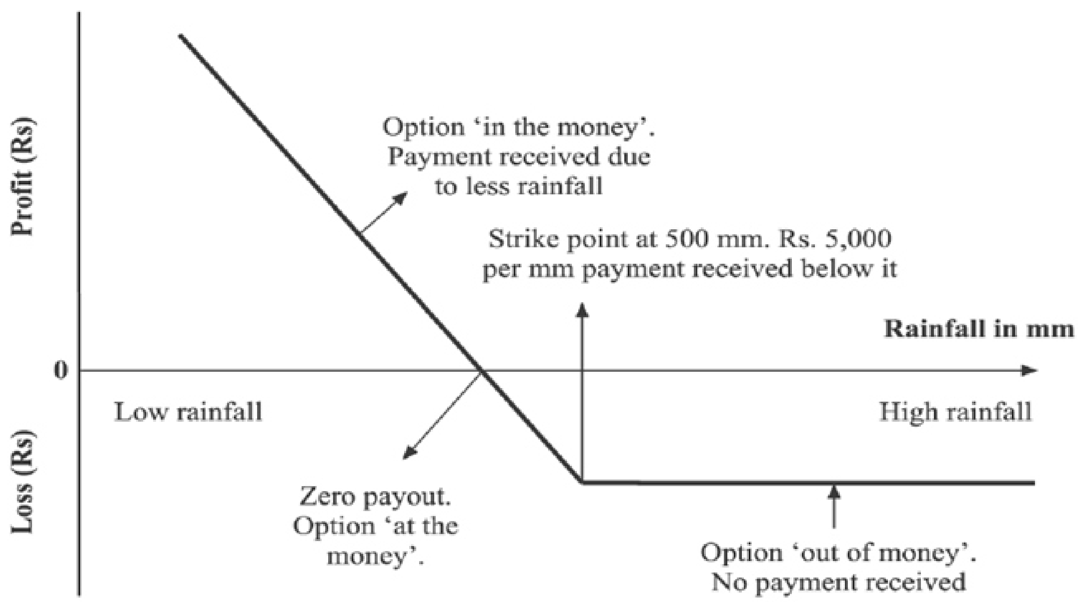
Though weather derivatives can be based on any standard derivative structure such as puts, calls, swaps, collars etc. but since rainfall options are popular throughout the world, we can also have call/put monsoon options to start with.

- Weather derivative option contract as protection against less than normal rain:

A buyer of a monsoon options can use the contract to hedge against the loss due to decline in crop yield in case of less than normal rainfall. A floor contract provides protection to the buyer against the risk from low rainfall in the form of specified payment per mm of rain and the loss of premium amount may be recovered from increased profit due to more than normal rainfall.

As a hypothetical case, suppose that 500mm of average rainfall is necessary for a healthy production of crop during the season. Additionally, suppose that any if rainfall is below this level, it will have adverse effect on the yield resulting in an approximate loss of Rs. 5,000 per mm. From this information, a weather derivative floor contract may be designed. The buyer of the contract pays a premium of Rs. 0.1 million. This is the maximum cost incurred by the buyer in case of high rainfall because if the rainfall is above the strike value i.e. 500 mm, the farmer will not be paid anything. If the actual rainfall during the contract period is below the 500mm level, the farmer is paid Rs. 5,000 per mm. The maximum payment will not exceed Rs. 1 million. Thus, the farmer, by using the contract, has secured himself against the risk of low rainfall up to 200mm below the strike of 500mm. The payout profile of this contract is shown in Figure 4.

Figure 4: Payout Diagram for Rainfall 200mm Below the Strike



Source: Spaulding et al (2003)

Thus, the farmers / producers can use weather derivatives to protect themselves against the risk of bad weather (low rainfall). Although the premium component in case of weather derivatives remains somewhat higher as compared to the insurance premium but this problem is resolved when weather derivative gains popularity and its market expands. Though we have chosen a monsoon option due to its popularity abroad, other forms of derivative contracts may be chosen depending upon the risk profile of the buyer / seller and their future expectations. A swap may be used if risk tolerance is low and parties do not want to pay contract premium. On the other hand, if probability of future price hike is high and parties can pay premium, a cap contract may be chosen.

However, such rainfall derivatives market will only prove useful if it is liquid. This will happen only if stock exchanges list contracts on monsoon risk. Exchange traded rainfall derivatives can prove to be very effective instruments for hedging monsoon risks in Indian agriculture. Instead of paying huge premiums for multi calamity insurance contracts, farmers can pay less premium and use derivatives to hedge off their risks. Exchange traded derivative transactions will entail less operational and administrative overhead expenses than insurance as no underwriting or inspections of individual farms would be required. Also, exchange traded instruments will have a larger market to cater and will provide easy liquidity. There is no counter party risk because the clearing house serves as the counterparty to each trade. As they can be individually bought and sold by each farmer, he can hedge his own risk unlike proving individual loss for getting insurance claims.

Besides agriculture; power and energy, insurance, construction, transportation, tourism and travel business, buyers and sellers of exchange traded weather contracts include hedge funds and reinsurers who need to hedge weather exposures they have incurred in the weather insurance markets. The various weather derivative beneficiaries are given in Table 3.

Table 3 - Weather Derivative Beneficiaries

Sectors	Uses
Agriculture	Crop yield, storage, pests
Construction	Delays, incentive/disincentive clauses
Energy	Reduced and/or excessive demand
Entertainment (tourism, event management..)	Postponements, reduced attendance
Governments	Budget overruns
Insurance	Increased claims
Manufacturing	Reduced demand, increased raw material costs
Agro based	Reduced production
Retailing	Reduced demand of weather sensitive products
Transportation	Budget overruns, delays

Source: http://knol.google.com/k/abahan-banerjee

- **Implementation Issues**

However, for the success of weather derivatives as a risk mitigation instrument in the market, its successful implementation is essential, which in turn depends on:

Institutional infrastructure - For trading of weather contracts on exchanges, an institutional infrastructure of derivative exchanges, brokers and weather observatories is required. This requirement can be fulfilled by introducing such trading onto existing, efficient infrastructures of derivative exchanges where securities and commodity derivatives are traded. Also required is accurate & secure measurement and dissemination of timely & reliable data on weather parameters, crop yields, etc. to all parties involved. For this purpose, additional 10,000 - 15,000 meteorological stations are proposed to be set up and manually operated weather stations are proposed to be automated for real- time dissemination of relevant weather data.

Regulatory mechanism - Presently, there is multiplicity of regulatory bodies and jurisdiction of regulators governing weather derivatives is not clear. SEBI regulates all trading of securities on all exchanges, Forward Market Commission regulates commodity exchanges and Ministry of Agriculture exercises indirect regulation over commodity trading. This overlapping regulatory jurisdiction with multiplicity of regulators causes confusion and hence, must be eliminated and an independent regulator with adequate resources and empowerment must be established for regulating weather derivative market.

Education & awareness among market participants - Weather derivative trading can be successful only if various market participants are well educated & trained for understanding the associated benefits and risks of the weather derivative products and their effectiveness.

Affordable, high-value products - Developing appropriate weather indices and designing of pricing mechanisms for weather derivative contracts is to be takencare of. Adequate and sustained demand for risk transfer products and new, high value products, as conditions evolve over time, are also required.

Conclusion

In spite of the challenges, it is time the Government should take concrete steps for promoting weather derivative trading on Indian exchanges. The Parliament has enacted legislation permitting trading of these contracts on exchanges. The Forward Market Commission has redefined commodity derivatives for enabling trades in intangibles like weather. This step holds a big promise for the development of weather derivative market in India.

Its success in other developed and developing economies only makes an unrefutable case for its adoption in India, where agricultural performance is substantially dependant on highly unpredictable, erratic weather conditions. Richard Sandor, known as founder of the interest rate derivatives, stated that Indian monsoon dependance poses a high degree of risk and hence, it is the perfect opportunity to design derivative products. According to results of the survey conducted by the Weather Risk Management Association (WRMA), released on May 12, 2010, the Indian weather risk management market could see major growth in several sectors with a total potential notional value of US $ 2.35 billion (Rs. 105 billion) over the next two to three years. Weather derivatives can not only be a profitable derivative product in our financial market, it can aid government to make better choices about weather risk management. Weather derivatives in India could play a significant role similar to the role of weather risk mitigation played by temperature derivatives in US today. Besides enabling hedging by various players like farmers, energy utilities, agri-businesses and insurance companies, weather derivative would complement and strengthen the nascent commodity derivatives market. Weather derivative can also be used as a new class of capital market instruments in portfolio management. While not a panacea, weather derivatives hold great promise for the people & the economy of India. The opportunity is great, and if we fail to act, the opportunity cost could be great as well.

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