
Piloting Deficit Rainfall Insurance

- Rainfed Farming Development Theme

by

**Narender Kande,
DHAN Foundation,
Madurai, India**

DHAN Foundation

Development of Humane Action

Giving back to the Society

About DHAN Foundation

- Development of Humane Action (DHAN) is a grassroots action agency working with poor.

Purpose

- Mothering of development innovations
 - Promoting institutions to reach scale
 - Human Resource Development
-

Ongoing Programmes

- Community Banking (Kalanjiam Foundation)
 - Tankfed Agriculture Development
 - TATA DHAN Academy
 - Information Technology for poor
 - Democratising Panchayats
 - Rainfed Farming development Theme (RFDT)
-

Concept of Risk management in RFDT

- Risk management is an integral part in rainfed farming development.
 - Financial risk management measures like insurance will be effective only in combination with other physical, biological and diversification risk management measures.
 - Physical: Bunding, Silt application
 - Biological: Quality seeds, Seed hardening
 - Building upon farmers' own practice
-

Piloting Deficit Rainfall Insurance (DRFI)

The Need:

- One of the major risks the rainfed farmers face is weather risk.
 - More than 60 to 80 % of the yield is decided by the adequate quantity and proper distribution of rainfall.
 - The risk due to long dry spell and drought are recurrent
-

The Need...

The traditional coping mechanisms used by farmers,

- ❑ Accumulation of buffer stocks
- ❑ Diversification of cropping pattern/agro enterprises
- ❑ Shifting to low risk (low return) crops
- ❑ Diversification of income sources
- ❑ Distress sale of farm assets
- ❑ Removing children from school
- ❑ Migration
- ❑ Borrowing

are not sufficient and not available to all, to manage income losses due to drought.

The Need...

Government's answer to this issue through crop insurance has been a failure in terms of

- ❑ Reach: Only 10 % of the farmers covered
- ❑ Very late compensation: More than 12 months
- ❑ Viability: The loss ratio for India is 5.72
- ❑ Administrative cost: Very high
- ❑ Political interference

So far, private sector participation in crop insurance has been negligible mainly due to covariate risk involved.

What is DRFI?

“An index based insurance, which uses weighted and capped rainfall data during different stages of the crop period, as a proxy for assessing the rainfed crop yield loss.”

“A client centered customized product ”

“Pools risk across the country/globe through reinsurance”

To whom DRFI is suitable

“To farmers who cultivates rainfed crop in the 30 km radius of an IMD station, which has minimum 20 – 30 years of historical data.”

“To Agricultural Laborers”

“ Literally to any body affected by deficit rainfall”

Two kinds of DRFI products

Single phase product

- ❑ Either for the crop period or for one critical period (like flowering of orange)
- ❑ Cheaper one
- ❑ Frequency of payout less

Multiple phase product

- ❑ Costlier
 - ❑ Frequency of payout high
-

How a DRFI policy looks like...

Type: **Single phase crop period policy**

Crop: Groundnut

Reference weather station: Tirupattur

Rainfall Index:

From	15-Jul	14-Aug	13-Sep	13-Oct
To	13-Aug	12-Sep	12-Oct	11-Nov
Weightage	20%	30%	35%	15%
Max.RF cap	110	150	200	125

Base Index

115.48

Payout calculation:

From % of base index	To %	Rs. Per % deficit
95 (<i>STRIKE</i>)	80	10
80	60	20
60	50	30
50	35 (<i>EXIT</i>)	85

Premium

Rs. 140

Sum Insured

Rs.3000

First year experience

- Crops covered –
groundnut & cotton in Vellore district &
blackgram and cotton in Madurai district.
 - No. of farmers 272
 - Sum Insured Rs. 6,36,000/- (\$14100)
 - Insurer: ICICI Lombard
-

First year experience...

■ Results

- Groundnut and cotton farmers at Vellore got compensation as there was deficit rainfall.
 - Blackgram farmers did not get as there was no deficit.
 - Cotton farmers at Madurai did not get compensation even though there was deficit rainfall and significant yield loss.
-

Current year status

- **Groundnut** – 253 acres belonging to 432 farmers covered for a sum of Rs. 1,518,000.
 - **Cotton** - 84 acres belonging to 172 farmers covered for a sum of Rs. 616,700.
 - **Insurer:** ICICI Lombard
-

Developments in the current year

Issue 1: Inconvenience to fix the policy initiation date in advance as no body knows when the rainfed crop is to be sown, as no body knows when there will be rain.

Solution adopted: In advance policies are made at five days interval for the whole sowing season; when sowing happens the nearest day policy is taken.

Developments in the current year ...

Issue 2: There is no time to collect premium and necessary data, as sowing abruptly happens based on the monsoon on set.

Solution adopted: As post monsoon sowing is done, there will be enough moisture even after 7 to 10 days of sowing, indicating there is no need for rainfall in this period. So the policy date is fixed at 10 days after sowing. This gives ample time to collect data & premium.

Developments in the current year...

Issue 3: Rainfall in the non-critical periods could affect the effectiveness of policy.

Solution adopted: Non – critical periods are removed from coverage period.

Issue 4: Excess rainfall in one day skewing the index

Solution adopted: Maximum rainfall per day limit for deriving index.

Issue 5: Ineffective low amt. of rainfall adding to the index.

Solution adopted: Minimum rainfall per day limit for deriving index.

Developments in the current year...

New issues in the current year:

- Use of the following techniques in premium calculation made the policy opaque for the farmers and field implementers and also made it costly.

Detrending

Loading the premium for accounting the probability of index falling below exit.

- Increase in loading for volatility from 15 % of SD to 25% also made the premium costly.
-

Major advantages- From Client side

- Transparent product
 - Quick payment of compensation
 - Customized product to each location, crop and community
 - Independently verifiable
-

Major advantages- From Insurer side

- Low administration and transaction costs.
Assessment is easy and cost on assessment is very less
 - Decreased moral hazards and adverse selection
 - Broad base of potential clients: farmers, banks, input suppliers, local governments.
 - Not amenable for political interference
-

Once the product gets standardized the potential advantages can be,

- Potential for Secondary Market
 - Could be sold to non-farmers (Others are also exposed to deficit rainfall risk)
 - Decreased risk for lenders could help mobilize rural credit and decrease cost.
 - Product flexibility: can be combined with traditional insurance (wrap-around), area yields, prices (revenue insurance) or mutual insurance
 - Can be a cheaper way to manage natural disasters by State.
-

Limitations

- **Basis risk** faced by farmers (i.e.) there is difference between the loss due to deficit rainfall to the farmers and that of the assessment of loss through DRFI.

This factor has resulted in the situation of not getting compensation, even when there was severe loss of cotton crop at Madurai in the first year.

The **basis risk** is mainly triggered by:

- Difference in rainfall between observing station and the farmers field.
- The sowing date could not be predetermined and so there is wide gap between the starting date of the policy and the actual sowing date.
- Inadequacy of the design to reflect the biological interaction between rainfall and the crops.
- Wider variations in rainfall even within the zone of the rainfall station (30 to 40 km radius)

Biological requirements Vs design of DRFI

Crop period	Matching crop period and policy period
Critical periods of rainfall requirement	Crop period segmentation Weightage
Rain beyond a particular level is not useful to crop	Maximum rainfall cap for each segment
Effects of different levels of rain deficit on the yield of crop	Pay out structure – -Graduated, multi phase -Strike, exit

Effects of deficit on crop vs design of payout

Deficit resulting in insignificant yield loss.	No payout.
Deficit that the crop can manage and resulting in moderate loss.	Single phase product is better suited than multi phase; even some times it may fail to reflect reality.
Deficit in the total crop period that is resulting in severe loss.	Single and multiple phase product are suitable.
Deficit in particular crop period phase that is resulting in severe loss.	Multi phase product suitable while single phase product is not.

Limitations continued...

- The market for DRFI restricted to areas only where IMD stations are available.
- Availability of historical data on rainfall
- The product is costly - actual premium ranging from 15% to 38%.
- More suitable to moderate risks and less suitable for extreme risks.
- Service tax of 10.2% on premium.
- Client comprehension of product.
- Weather may be one of several risks.

In essence...

DRFI is a potential means of managing losses due to long dry spell/drought

But this instrument is in the early stage of development and is in need of evolution and promotion to make it effective

Way forward.....

The three dimensions in which there need to be progress are,

- Improving the product *per se*
 - Improving the enabling environment
 - Promotional support
-

Improving the product

- Using local weather station data
 - Making segmentation, weightage, rainfall cap and payout model reflect the biological requirements- precise bio-actuarial modeling
 - Going for a new product - a hybrid of SPP & MPP
 - Insuring for specific rainfall events
-

Improving the enabling environment

- Installation of secure rain gauges as a close network - Effort of Karnataka govt.
 - Underwriting arrangement till this emerging market is sufficiently developed
 - Appropriate legal and regulatory framework
 - Support in precise bio-actuarial modeling
-

Promotional Support for participation of farmers in this joint experimentation

- Educating them on value & use of DRFI
 - Until the product becomes effective:
 - Removing service tax
 - Meeting the administrative cost
 - Support to unaffordable farmers
-

Support from People Mutuals

- Borne the 'administrative component' part of the premium while the farmers bore the 'risk premium' component
-