

# Index-Based Weather Insurance for Farmers in Malawi

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Ministry of Agriculture and Food Security  
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## MOTIVATION 1

Traditional crop insurance for smallholder economies is often **not viable**

- High monitoring and administrative costs
- Adverse selection due to asymmetric information
- Moral hazard

## MOTIVATION 2

Traditional credit supply systems for smallholders are also commonly undermined by drought (or floods)

- High monitoring and administrative costs
- Side marketing
- Political interference

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## Key Question

Can weather insurance be used to reduce lending risks to smallholder farmers?

*Insure loan repayment in the event of crop failure*

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## CHALLENGE

Design an alternative, efficient and cost-effective crop insurance program that can be easily reinsured and distributed to individual smallholder farmers.

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## WHAT IS WEATHER RISK PROTECTION?

Financial protection based on the performance of a specified weather related index in relation to a specified trigger (*micro and macro*)

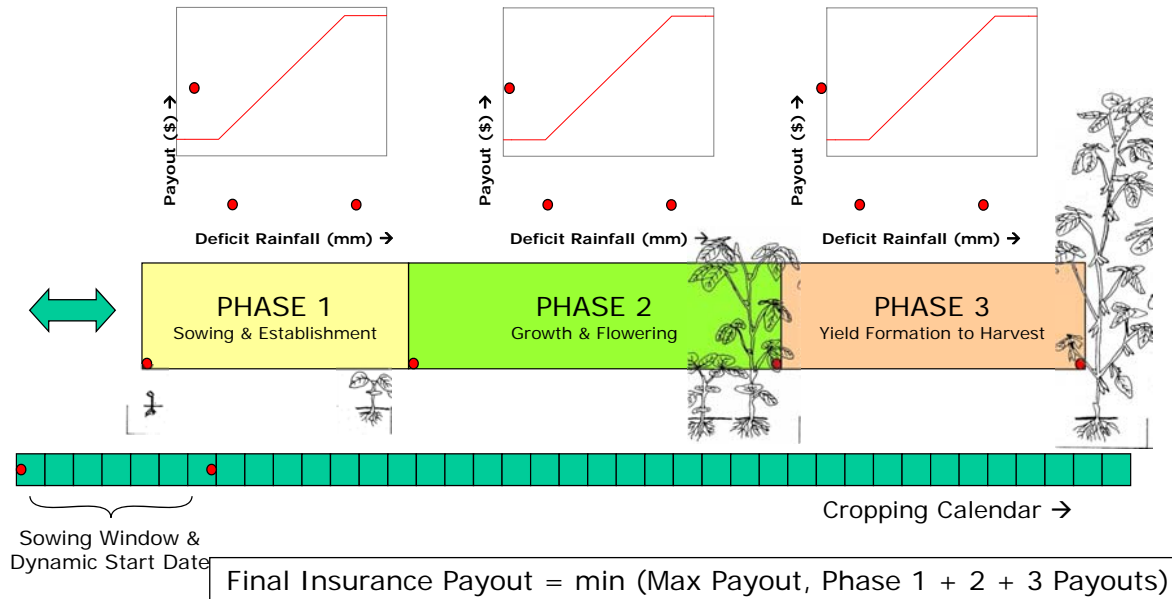
### Malawi micro weather insurance model

- *Weather index = rainfall x crop growth model*
- *Trigger = decline in crop production associated with:*
  - i. Not enough rain for crop establishment
  - ii. Not enough (or too much) rain for crop growth and flowering
  - iii. Not enough (or too much) rain at yield formation (e.g. grain fill)

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# MALAWI WEATHER CONTRACT FEATURES

Three-phase crop growth scenario calibrated to a simple crop water-balance model, cross-checked against historical yields, to minimize farmer Value-at-Risk



## Requirements for implementation (1)

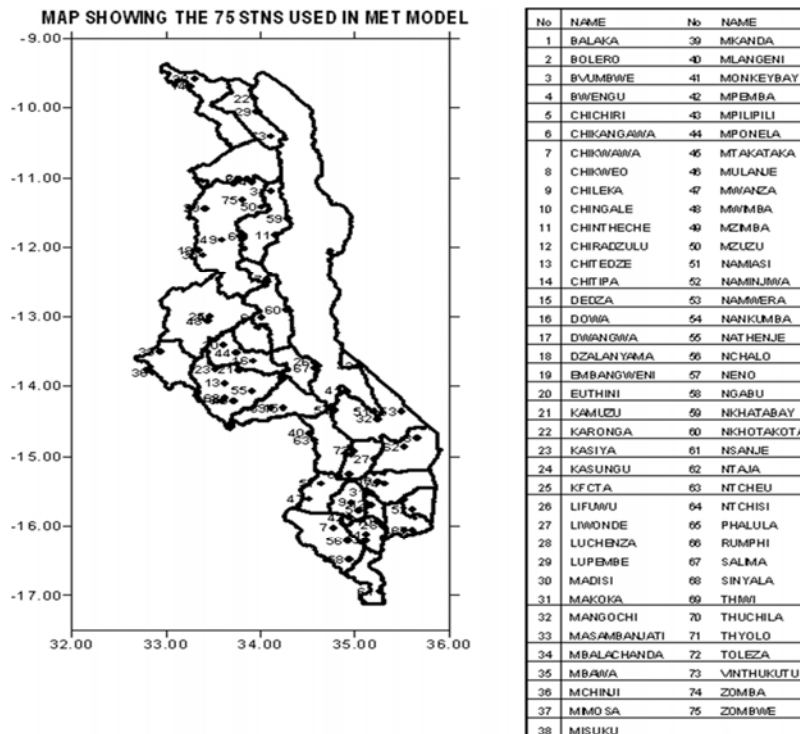
- Reliable weather stations with good enough historical data (e.g. 30 yrs) to evaluate rainfall risk
  - Within 20-30 km of each farm insured (ie high density)
  - With reliable daily data feed
- Well defined crop growth models based on water satisfaction index

## Requirements for implementation (2)

- Regulatory and legal system underlying the insurance contract
- Sustainable links with reinsurance industry
  - due to covariant risks (e.g. drought)

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## Distribution of Rainfall stations in Malawi



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## Weather Insurance Portfolio in Malawi

Crop Season	# Farmers	Sum Insured	Crops
2005/06	892	\$40,000	groundnut & maize
2006/07	1800	\$110,000	groundnut & maize
2007/08	605	\$308,000	Tobacco
2008/09	2606	\$2,543,345	Tobacco
2009/10	766	\$712,521	Tobacco
2010/11 (forecast)*	10,500	\$4,500,000	Tobacco (maybe cotton, tea...)

\* By Weather Insurance Task Force members

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## Lessons Learned (or hypothesized) 1

There are 2 major risks to agricultural credit supply

- ⊙ Rainfall
  - ⊙ Avoidance of loan repayment (ie with side marketing)
1. Success is more likely with a single channel marketing system encompassing stop orders on loan liabilities
    - ⊙ Loan repayment was too low for groundnut and maize

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## Lessons Learned (or hypothesized) 2

2. Portfolio insurance may be more practical than insuring each individual farmer
  - Tobacco companies and banks divide the premium cost *[though this remains subject to debate]*
  
3. It takes time to build the capacity for contract design in the insurance industry
  - Close links are needed with crop modelers
  - Develop capacity to define appropriate premiums
  - Links with international reinsurance market

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## Lessons Learned (or hypothesized) 3

4. Insurance regulations may only be adjusted when a major drought occurs, and one or more companies face difficulty covering their liabilities.
  
5. Leadership of the *Insurance Association of Malawi* is valuable, but ultimately the product must be competitively offered by individual insurance companies.  
*[profitable to date, but long term payoffs are difficult to judge]*

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## Lessons Learned (or hypothesized) 4

6. Rainfall index insurance covers only one set of production risks

*[needs to be linked with complementary strategies for reducing risks - e.g.*

- *hail, fire, theft insurance;*
- *improved reliability of marketing chains*
- *More efficient credit supply and monitoring (e.g. biometrics, credit bureau)*
- *resilient agronomic practices]*

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## VISION FOR MALAWI: Next 5 YEARS (1)

- Strengthen capacity of local insurance industry to:
  - Design contracts
  - Evaluate and set appropriate premiums
  - Manage reinsurance requirement
- Review and strengthen capacity of regulatory systems
- Expand coverage in the tobacco sector
  - With more rainfall stations *(to be purchased & managed by?)*

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## VISION FOR MALAWI: Next 5 YEARS (2)

- ◉ Expand coverage to additional crops
  - ◉ Cotton, tea, coffee, sugar, maize...  
(Link with growing interest in contract farming?)
- ◉ Reduce premiums or reduce interest rates on agricultural loans to account for lower risk
- ◉ Expand market enough to be of competitive interest to reinsurers