



Bern University  
of Applied Sciences



Index-based insurance: An adaptation to climate change induced risks in cocoa production in Ghana

Lydia Afriyie-Kraft  
SFIAR award presentation  
Bern, 10.12.2018



# My motivation ...the problem

- Cocoa farmers can experience years of good or bad yield
- Climate change increases the chances of bad yield
- Financial adaptation is crucial
- Index insurance can enhance resilience and reduce vulnerability



# Objectives

➤ To determine:

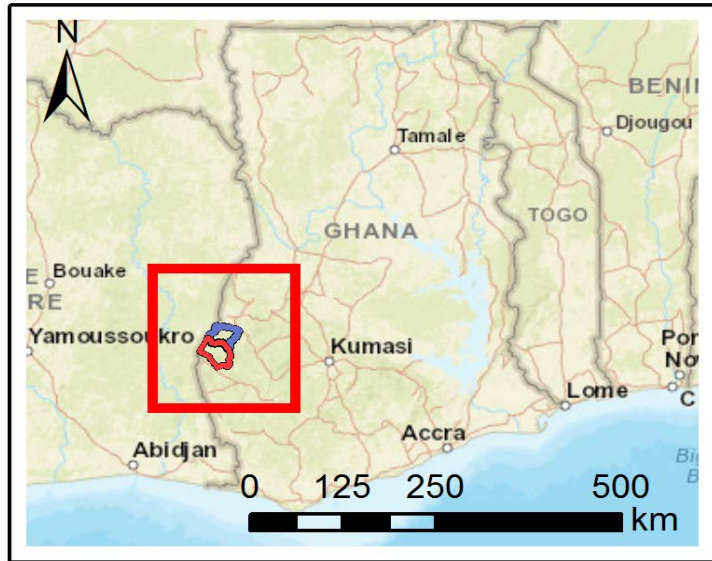
- Farmers' perceptions and experiences of climate change
- Farmers' perceptions and experiences of insurance, particularly index insurance
- The factors that can influence WTP and provision of index insurance to farmers





# Research approach

## Study area



## Focus group discussions

- Determine farmers' WTP for index insurance at the district level

## Household survey

- 20 communities
- 313 households interviews

## Stakeholder analysis

- Identify actors
- Information to collect

## Key informant interviews

- Insurance companies
- Ghana Cocoa Board
- Research institutions
- Reinsurers
- Meteorological service



# Findings and interpretation

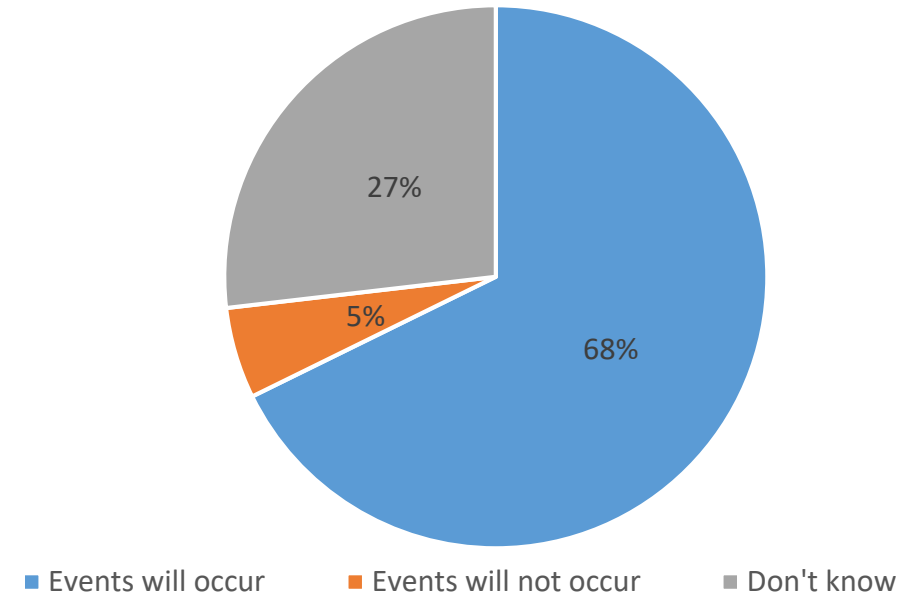
## Experiences of risk

- 91% have experienced changes in the weather pattern

Weather variable	Frequency	% of respondents (N = 313)
Rainfall variation	226	72.2
Drought	73	23.3
Extreme temperature	62	19.8
Strong winds	3	0.96

<<Multiple responses allowed\*>>

## Perception of risk occurrence



# Willingness to pay for index insurance

- 93.3% were willing to pay
- 83.2% willing to pay  $\geq 10\%$  of yield
- Average WTP = 12.2% of yield

Distribution of amount willing to pay

Amount WTP	Yield (%)	Frequency	Percent (%)	Dormaa West (Response %)	Bia East (Response %)	Statistical test
Minimum (47)	1-5	44	15.2	50	50	$\chi^2 (5, N = 289) = 14.1, p = 0.015$
	6-9	3	1	-	100	
Maximum (242)	10	143	49.5	52.4	47.6	
	11-15	48	16.6	39.6	60.4	
	16-20	36	12.5	58.3	41.7	
	>20	15	5.2	86.7	13.3	
<b>Total</b>		<b>289</b>	<b>100</b>	<b>287</b>	<b>313</b>	
No response	-	2	0.6	-	-	

# Evaluation of factors and barriers to WTP

Variable	Specification	Freq.	Percent	N
<b>Forms of payment</b>	Pay with cocoa beans	88	30.24	291
	Deduct after sales of cocoa	188	64.60	
	Don't know	12	4.12	
	Other income source	3	1.03	
<b>Reasons for WTP</b>	Protection	121	36.67	330
	Support	77	23.33	
	Security	109	33.03	
	Regain money loss	10	3.03	
	Everyone is doing it	13	3.94	
<b>Reasons for not WTP</b>	Won't work in Ghana	5	21.74	23
	Don't need help	1	4.35	
	Land tenure issues	14	60.87	
	Insurers not trust worthy	3	13.04	
<b>WTP with basis risk</b>	Yes	175	60.14	291
	No	102	35.05	
	Don't know	14	4.81	

# Institutional influences on index insurance ...

## Perception of insurance

- Relevant due to observed extreme events, changing weather patterns
- Farmers will take insurance cover because they fear risks.
- Can cover risks: heat stress, drought...
- Risk transfer → in extreme events, payouts become start-up capital
  
- Good element but not the only solution
- It works if the principles of insurability are maintained → events happen by chance



# Institutions and index insurance...

## Opportunities/ advantages of index insurance

- No moral hazard, no loss adjustment
- Less transaction cost
- Can insure micro loans by default
- About 100 weather stations with 30km intervals
- Reliable data since 1970s with 70 - 90% accuracy
- Untapped market and large number of cocoa farmers
- Available yield data drawn from purchasing clerks



# Institutions and index insurance...

## Threats

- Incomplete and unreliable data
- Index planning: transparency, access to information
- Land ownership issues
- Difficult to cover entire production risk
- Lack of risk management techniques
- Huge upfront investment e.g. to educate farmers
- Low adoption potential and profitability for insurers
  - Commercially not viable at the start



# Institutional influences on index insurance

## Addressing Basis Risk

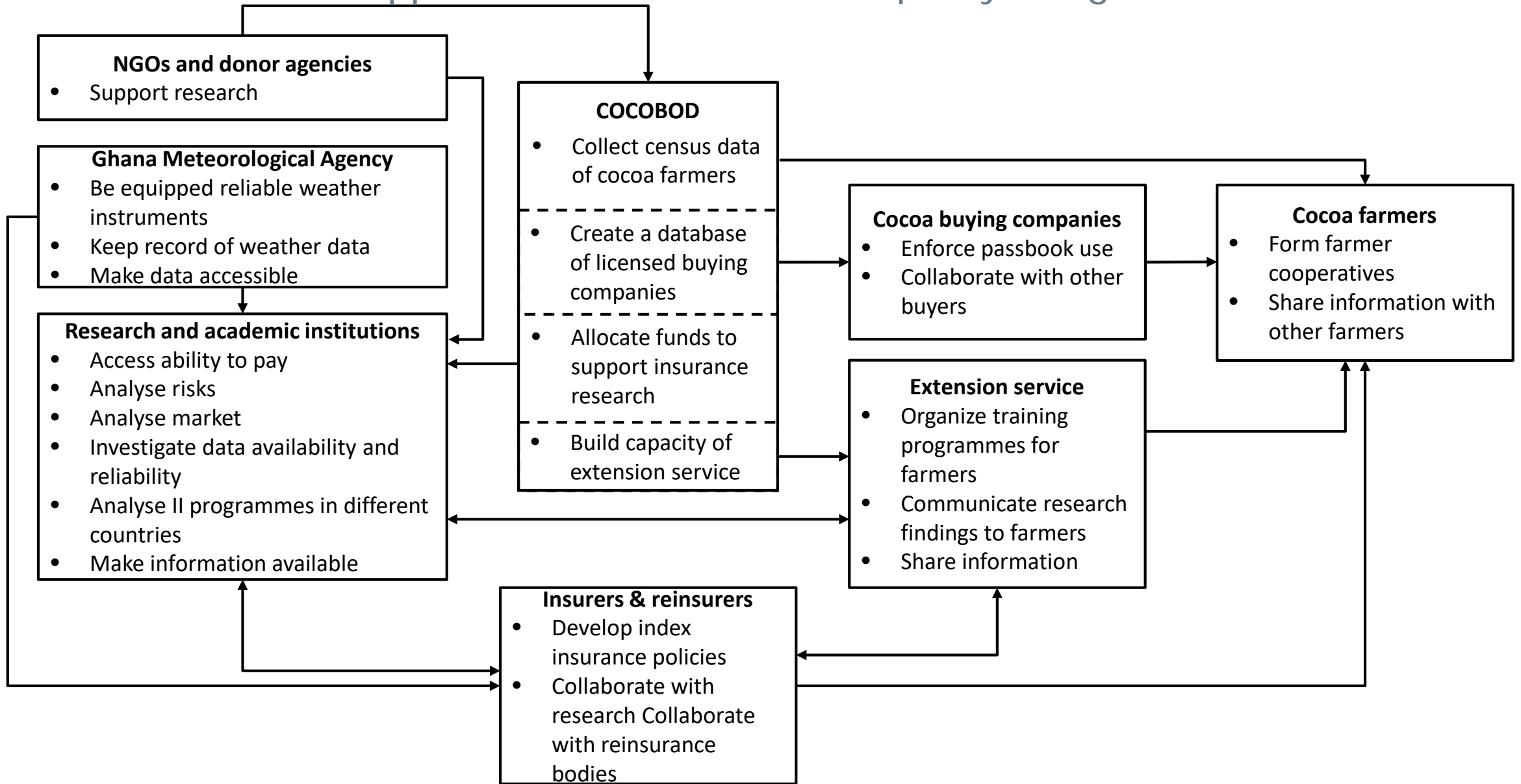
- Well-defined thresholds with index tailored to key parameters of success.
- Complement weather data with remote sensing technology.
- Refund 25% after three years of no trigger.
- Spray farms to avoid pests and diseases.
- Strengthen the capacity of meteo service.

# Conclusion and recommendation

- Farmers have been exposed to extreme events.
- They anticipate the occurrence of climate related risks.
- The majority are willing to pay for index insurance.
- They perceive insurance as an initiative that can provide security.
- Tenure and basis risks can influence insurance.
- Well planned insurance policy can reduce basis risks.



# Recommended approach to index insurance policy design



## Way forward...

- Potential for insurance → cost vs. benefit
- Type of risks, historical and yield data, infrastructure
- Specific crop index
- Clear premium-payout calculations
- Farmers' incomes vs. ability to pay premiums
- Farmer cooperatives
- Good farm management practices
- Mitigation measures for risks covered
- Clear implementation strategy



# Acknowledgment and dedication

- My supervisors:
  - Dr. Astrid Zabel von Felten
  - Dr. Lawrence Damnyag
- African Forest Forum
- All friends and loved ones
- My late mom: Comfort Boakyewaa
- My Brother: Raphael Gyamfi

Thank you for your attention

