

# Managing the Financial Impact of Weather Risks on the Australian Agriculture Sector

## Case Study

## Forest Hill horticulture and cotton farm

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Australian Government  
Department of Agriculture,  
Fisheries and Forestry



Future  
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**QFF** QUEENSLAND  
FARMERS'  
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Theodore Water Pty Ltd

Eton Irrigation

Queensland Oyster Growers Association

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# About QFF

**The Queensland Farmers' Federation (QFF) is the united voice of agriculture in Queensland.**

- Member-based organisation representing the interests of peak agriculture industry organisations (state and national).
- Collectively, we represent 13,000 primary producers.
- We work with the government of the day on behalf of the agriculture sector, farmers and the community to build a strong future Queensland agriculture.
- We develop policy and advocate on behalf of our industries.

## Who we represent

- Cotton
- Horticulture
- Sugar cane
- Nursery and garden
- Turf
- Dairy
- Poultry
- Pork
- Intensive animal industries
- Irrigators

## About parametric insurance

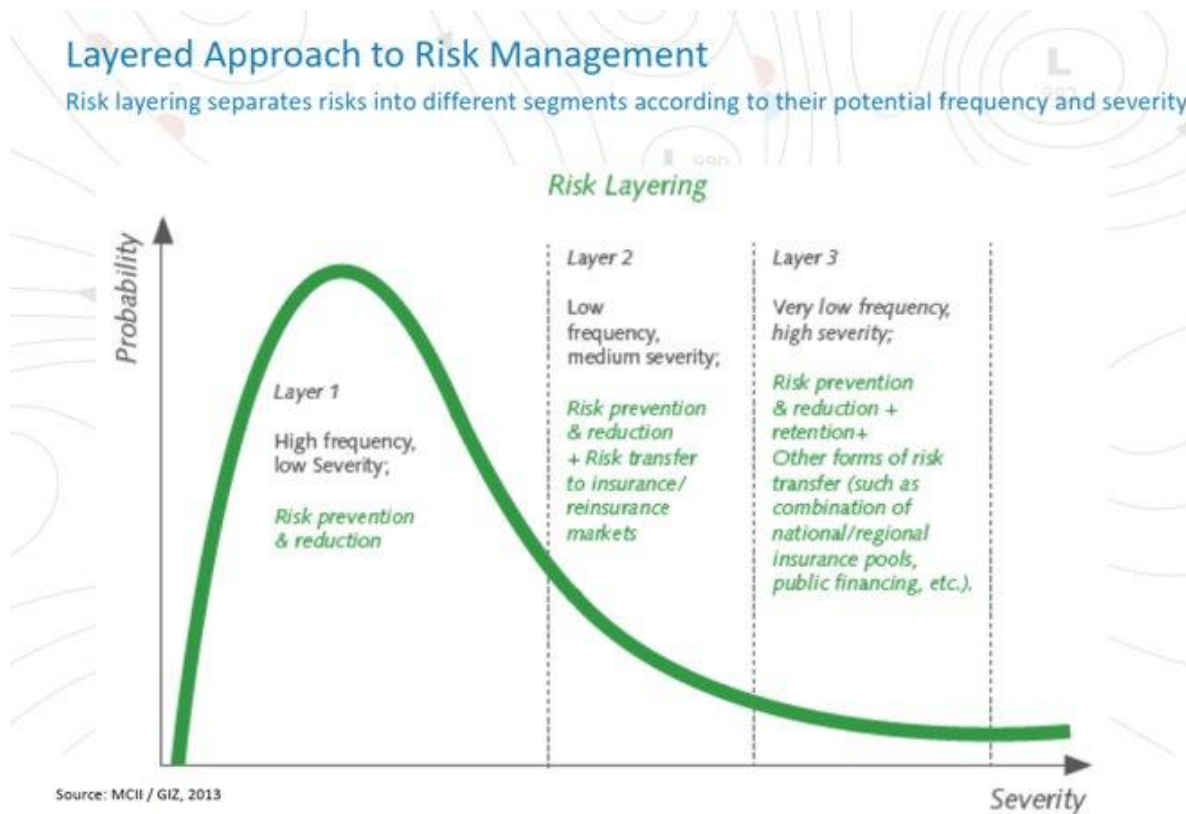
The project investigates the viability of parametric crop insurance products for agriculture businesses by testing a parametric index value to a risk event.

Parametric crop insurance may be one important part of a farm risk management strategy to mitigate yield loss and income volatility caused by excessive dry conditions or natural perils such as cyclone, frost, hail or flood.

Parametric index solutions provide an alternative way of transferring the risk of revenue loss or cost impact of natural disasters. These solutions differ from traditional indemnity insurance policies. Parametric policies may be designed and calibrated to reflect the specific locations, exposures and risk management objectives of the farmer. Loss payments respond to the occurrence of a pre-agreed trigger event index and are not assessed based on damage.

Products can have a flexible structure: single season, annual or multi-year arrangement. Claims are settled very quickly after the occurrence of the policy trigger – usually within 14 days.

# Managing the Financial Impact of Weather Risks



## Opportunities?

Industry mutual to create affordable parametric solutions for farmers (DMF model).

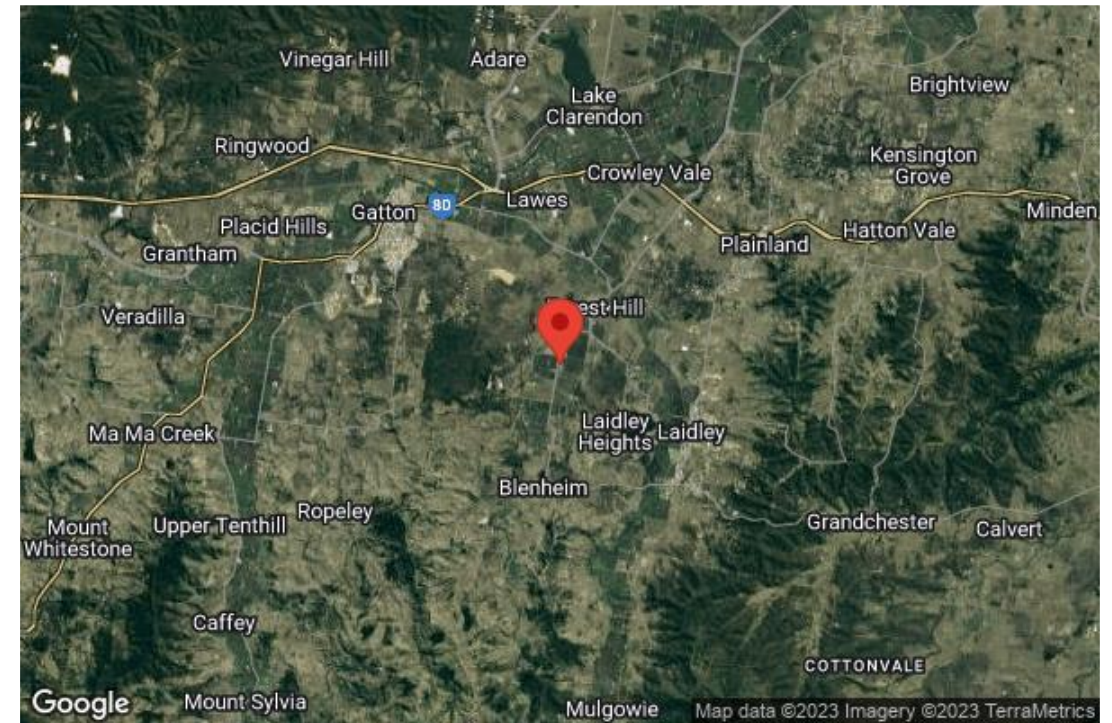
Work with government to design effective disaster recovery fund solutions that enable farm resilience and long-term affordability.

## Case Study Profile

Industry: Horticulture & Cotton

Location: Forest Hill, QLD 4343

Weather Risks: Drought, flood, hail



## Summary

In this case study, the project team use scenarios of key risks to write a parametric insurance product on farm located in South-East Queensland that grows cotton and seasonal horticulture crop. During the project, the farm was impacted by hailstorm where the parametric index was triggered and a payout would have occurred.

## Farm Profile

The farm is located at Forest Hill, in the Lockyer Valley, Queensland. The main crop is mixed greens and for recent seasons, the farm has planted cotton.

The farmer has held cotton hail insurance past two years. The farmer is participating in a trial of the Hailios hail sensor as part of this project. The farmer has held two on site meetings with the project team and is in regular contact with the team.

The insurance team has obtained a summary of their priority risks, ascertained the growers' level of comfort with current crop insurance held for the cotton crop (but not hort crops), and provided a detailed insurance profile and quotes for risks of drought, hail and heat.

## Historical Weather Events

The farm location has experienced hail damage, suffering significant losses in a 2014 hail storm. The farm is located in the SE QLD and NE NSW hail-prone areas - Brisbane and just north of Brisbane have been subject to hail >3cm, hail intensity rather than stone size is key concern.

Rainfall is very volatile and per annum rainfall of less than 500 mm can cause loss of yield. Record 100 year low was in 2019, with only 375 mm rainfall.

The farm is located in a flood-prone area of the Lockyer Valley.

Heat and clear days historical high 41.11° and 39.97° both in 2014.

# Parametric Solution – Hail, Drought, Heatwave

The parametric insurance policy has been structured to cover extreme climate risks around Hail, Drought and Heat. The farmer was provided with a quote for each of the risks with options for a combined cover or single index policy.

These perils in different degrees can be regarded as catastrophic or cause significant crop yield loss, therefore having a policy in place enables financial resilience.

Peril and Parameters					
<b>Hail</b>					
Hail is measured from a Hail Plate. We have two policies A= diameter and B= diameter and velocity					
<b>Rate Your Risk:</b>	60%				
<b>Risk Period:</b>	1st Nov - 31st Mar				
<b>Sum Insured:</b>	\$600,000				
<b>Premium A or:</b>	\$30,000				
<b>Rol:</b>	5%				
<b>Premium B</b>	\$54,000				
<b>Rol:</b>	9%				
<b>Drought</b>					
This starts to pay at 500mm and full payout occurs at 250mm.					
<b>Rate Your Risk:</b>	30%				
<b>Risk Period:</b>	1st Oct -30th Sept				
<b>Sum Insured:</b>	\$300,000				
<b>Premium:</b>	\$54,000				
<b>Rol:</b>	18.0%				
<b>Heat</b>					
This cover starts on each cumulative degree after 1° over 40°. Each degree it pays \$10000.					
<b>Rate Your Risk:</b>	10%				
<b>Risk Period:</b>	1st Nov - 31st Mar				
<b>Sum Insured:</b>	\$100,000				
<b>Premium:</b>	\$24,100				
<b>Rol:</b>	24%				
<b>Hailsizes</b>		<b>Payout</b>			
5.00 <= d		100.00%			
4.00 <= d < 5.00		75.00%			
3.00 <= d < 4.00		25.00%			
2.00 <= d < 3.00		10.00%			
<b>or</b>					
<b>Hailsizes (stone max. diameter in centimeter)</b>		<b>Low Intensity (1 &lt;=N&lt;10)</b>	<b>Moderate Intensity (10 &lt;=N&lt;80)</b>	<b>High Intensity (80&lt;=N&lt;400)</b>	<b>Extreme Intensity (N&lt;=400)</b>
d>=5.0		10%	20%	50%	100%
4.00 <= d < 5.00		5%	15%	40%	85%
3.00 <= d < 4.00		3%	10%	30%	70%
1.50 <= d < 3.00		1%	5%	15%	30%
<b>Terms</b>		<b>Terms</b>			
Strike ( <Decil 1) mm		500			
Threshold		0			
Tic Size		\$1,200			
Cover Length mm		250			
<b>Terms</b>		<b>Terms</b>			
Strike		1			
Threshold		40°			
Tic Size		\$10,000			

## Hail Event

On 10 November, 2023, the farm was impacted by a severe hail storm. The Hailios hail plate located on the property was impacted and recorded multiple “hits”, stone size, density and timeframe.

While there were no lightning strikes recorded, the wind speed ranged from 25.9km/hr to 23.7km/hr.



Lightning Strikes	0	Lightning Strikes	0	Lightning Strikes	0
Temperature [C]	22	Temperature [C]	22	Temperature [C]	21.2
Temperature [F]	71.7	Temperature [F]	71.7	Temperature [F]	70.2
Wind dir mean	103.4	Wind dir mean	103.4	Wind dir mean	120
Wind speed max [kmh]	23.7	Wind speed max [kmh]	23.7	Wind speed max [kmh]	25.9
Wind speed max [mph]	14.7	Wind speed max [mph]	14.7	Wind speed max [mph]	16.1
Wind speed mean [kmh]	8.5	Wind speed mean [kmh]	8.5	Wind speed mean [kmh]	9
Wind speed mean [mph]	5.3	Wind speed mean [mph]	5.3	Wind speed mean [mph]	5.6

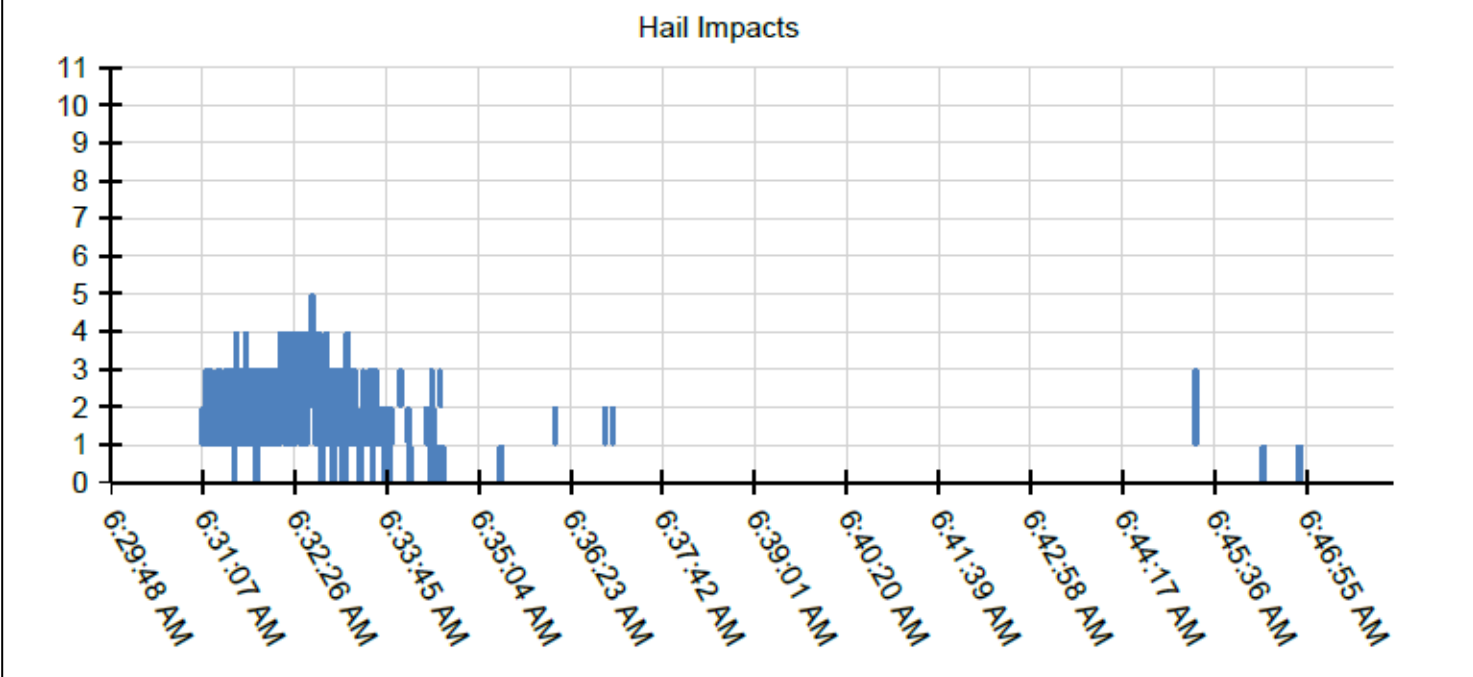


# Hailios hail sensor - trigger



**Sensor ID:** 1  
**GPS:** -27.6088496563171 152.343756763754  
**# Impacts:** 426  
**Max. hail class:** 5  
**Total kin.energy [J]:** 337.582

Hail Class	H1	H2	H3	H4	H5	H6	H7	H8			
Diameter [inch]	... - 0.50	0.50 - 0.75	0.75 - 1.00	1.00 - 1.25	1.25 - 1.50	1.50 - 1.75	1.75 - 2.00	2.00 - 2.25	2.25 - 2.50	2.50 - 2.75	2.75 - ...
Diameter [cm]	... - 1.27	1.27 - 1.90	1.90 - 2.54	2.54 - 3.17	3.17 - 3.81	3.81 - 4.44	4.44 - 5.08	5.08 - 5.71	5.71 - 6.35	6.35 - 6.98	6.98 - ...
# Impacts	20	187	193	25	1	0	0	0	0	0	0



Note: timezone recorded is US Central time

# Parametric Solution

Two quotes obtained from re-insurance market that would have paid out to the grower, respectively \$180,000 or \$150,000 within a fortnight of the trigger event.

Hailsizes (stone max. diameter in centimeter)	Low Intensity (1 ≤ N < 10)	Moderate Intensity (10 ≤ N < 80)	High Intensity (80 ≤ N < 400)	Extreme Intensity (N ≤ 400)	
d ≥ 5.0	10%	20%	50%	100%	
4.00 ≤ d < 5.00	5%	15%	40%	85%	
3.00 ≤ d < 4.00	3%	10%	30%	70%	\$180,000
1.50 ≤ d < 3.00	1%	5%	15%	30%	

Hailsizes	Payout	
5.00 ≤ d	100.00%	
4.00 ≤ d < 5.00	75.00%	
3.00 ≤ d < 4.00	25.00%	\$150,000
2.00 ≤ d < 3.00	10.00%	

## Conclusion

In this case study, the application of the Hailios hail plates has proved that a triggered event, verifiable by the Bureau of Meteorology and direct plate impressions can provide the evidence needed by insurance companies to trigger a payout.

In this instance, hail was evidenced, but the farmer chose not take up the insurance product and therefore missed out on a payout.

## Next Steps

The farm continues to participate in the hail trial and is continuing to inform the project team of various weather-related events occurring on the property.

